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ABSTRACT

Developed to provide teachers with specific directions for teaching about the environment, these guidelines for Washington state schools explain how environmental education can be integrated into every level of the school system. A general systems approach is proposed that emphasizes the interactions that exist within the natural environment. The guidelines identify core themes and a conceptual structure that encourages a synthesis of subject matter across and between a variety of traditional disciplines. Contents include: (1) philosophy of environmental education; (2) identification of ten core themes; (3) directives on using the guidelines; (4) framework for environmental education; (5) learner outcomes for four major goal areas; (6) steps in carrying out an environmental program; (7) planning model; (8) staff development inservice program; and (9) program evaluation. Appendices contain lists of curriculum programs and resources, a glossary, and the legal authority for environmental education in the State of Washington. (ML)

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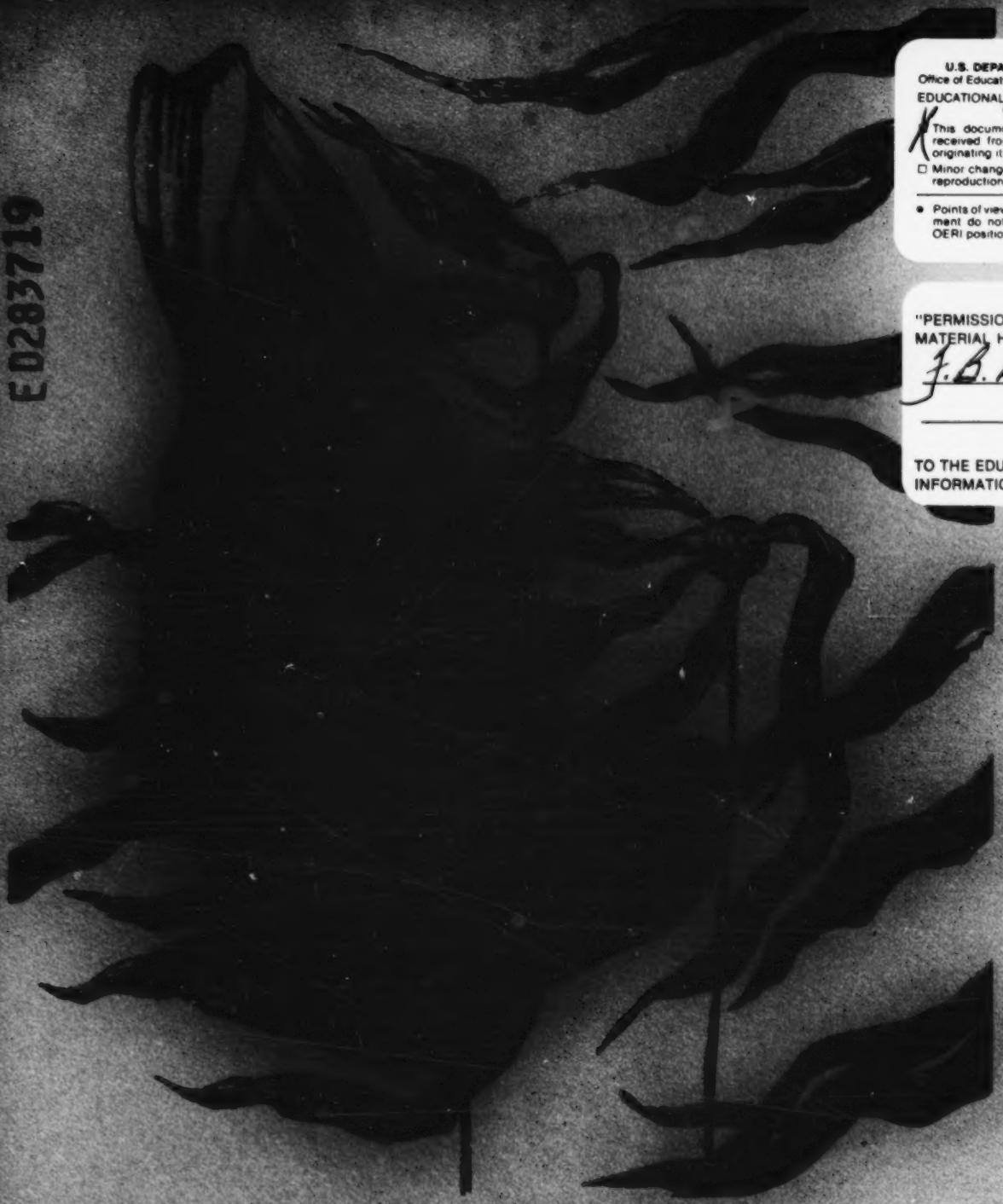

Environmental Education Guidelines for Washington Schools

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Art by **Tony Angell**, from his selected works, including *Marine Birds and Mammals of Puget Sound, Blackbirds of the Americas*, and *Ravens, Crows, Magpies and Jays, and used with his permission.*

Environmental Education Guidelines for Washington Schools

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SPI

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A Message to Environmental Educators

In the following pages, you will consider the four goals that give substance to this document. These goals form the framework for Environmental Education, and succinctly capture and present the basis of environmental literacy.

They point like an arrow toward the responsibilities of educational planners, teachers, learners, and those who would encourage and direct us. We know of no more effective method of achieving these essential learnings than through direct instruction by knowledgeable and caring teachers.

People have come to expect a great deal from Environmental Education in Washington schools. The outcomes that are called for include respect for the land and all living things, fundamental knowledge of how the environment works, a personal and societal sense of responsibility for the stewardship of our natural resources, and the maintenance of a high level of environmental quality. To these ends, the Washington State Legislature and the State Board of Education have specified that the environment be included as a topic of instruction in the curriculum of our schools.

We have learned over many years that Environmental Education is a collaborative form of education. It requires support and cooperation from all sectors of our society to achieve its intent of environmental literacy.

My thanks to the many individuals, agencies, corporations and organizations who contributed their knowledge, energy, and encouragement to the development of these guidelines, and who support and teach these concepts.

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A special word of acknowledgement needs to be noted for a series of documents entitled *Designs for the Future of Environmental Education*. This six volume report was commissioned by the Office of Environmental Education of the U.S. Department of Education, and submitted to **Walter Bogan** of that office in 1979-80 by **John N. Warfield** of the School of Engineering and Applied Science, University of Virginia, Charlottesville.

These works, coupled with a series of staff development programs from the **Far West Regional Education Laboratories,** formed a most valuable and influential research-oriented data base describing the interdisciplinary nature of environmental education. Our thanks to Mr. Bogan for his kindness in making that report available for our use.

Mrs. Cara Charles provided the staff support for the entire guidelines writing project. In addition to the necessary organization and paperwork, she typed the first draft materials as they came from the writing team.

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Dr. John Hug of the Ohio State Department of Education was most supportive in allowing us to reprint his statement ,"Two Hats," and in providing permission to use parts of *Energy and Resource Conservation* to bolster our staff development and curriculum resource sections.

PREFACE

In my view, there is nothing more important for the future of our children than integrating environmental education into every level of our school system. Certainly, students should learn about the science of ecology starting in their earliest science courses. But environmental concerns also can be introduced in social studies, mathematics, language arts, geography, and so on.

There is no reason, for instance, that large numbers can't be taught with large numbers of people. A square with a thousand rows of people, each a thousand persons long, makes a million people; five *thousand* squares like that is just about the number of people on Earth now. Each year there are more than eighty new squares. Farmer Brown stories can include how sun, rain and soil are crucial to the production of crops, and how natural systems work to produce soils, cycle fresh water, control pests, and so on. How the government works can be illustrated with the problems and triumphs of maintaining the integrity of our environment and protecting our health.

The Environmental Education Guidelines for Washington Schools has been carefully developed by practitioners—teachers experienced in handling environmental issues.

The guidelines represent a variety of subjects to be given priority, with a focus on the environment. These areas have been developed to reflect both local and global conditions and to include a wide range of concerned players: industry and environmentalists, minorities and the majority, science and the arts.

The goals and guidelines provide an excellent tool for doing that most critical thing—showing students how thinking and acting locally to solve environmental problems can be tied to strategies for preserving the global environment.

But this document is just a tool. It is your challenge to use it—to use it to expand your opportunities for making education an important element in our struggle to preserve a world that coming generations cannot just survive in, but can thrive in. Educators today can strive towards no greater goal.

Paul. R. Ehrlich
Bing Professor of Population Studies
Stanford University

9

Table of Contents

A Message to Environmental Educators ——— III

Acknowledgements ——— Iv

Preface: Paul Ehrlich Speaks to Environmental Educators ——— vII

Table of Contents ——— Ix

The Philosophy of Environmental Education ——— 1

Introduction: An Approach for Environmental Educators—10 Core Themes ——— 3

How to Use These Guidelines ——— 5

The Framework for Environmental Education ——— 7

Learner Outcomes:
Goal I The student will develop knowledge of the components of the environment and their interactions. ——— 9

Goal II The student will value the environment as the basis of our physical lives, economy and emotional well-being. ——— 19

Goal III The student will apply personal decision-making skills to enhance environmental quality. ——— 29

Goal IV The student will develop and utilize the knowledge and skills necessary for cooperative action on behalf of the environment. ——— 35

Steps in Carrying Out the Environmental Education Program ——— 41

The Environmental Education Planning Model ——— 42

Staff Development: The Program of Inservice Education ——— 43

Ways to Evaluate the Environmental Education Program ——— 45

Appendices:

A. Points of View ——— 47

B. Annotated Curriculum Programs and Resources ——— 51

C.Program Development for Resource Management Agencies ——— 61

D. Glossary ——— 63

E. Legal Authority for Environmental Education ——— 71

The Philosophy of Environmental Education: Washington State and the World

Whether we speak of a global community, our nation or neighborhood, the undisputed fact is that every minute more and more of us are making demands on the resources required for life. As we extract essentials from our environment, or dispose of the by-products and waste, more of us are beginning to understand the realities of scarcity and pollution.

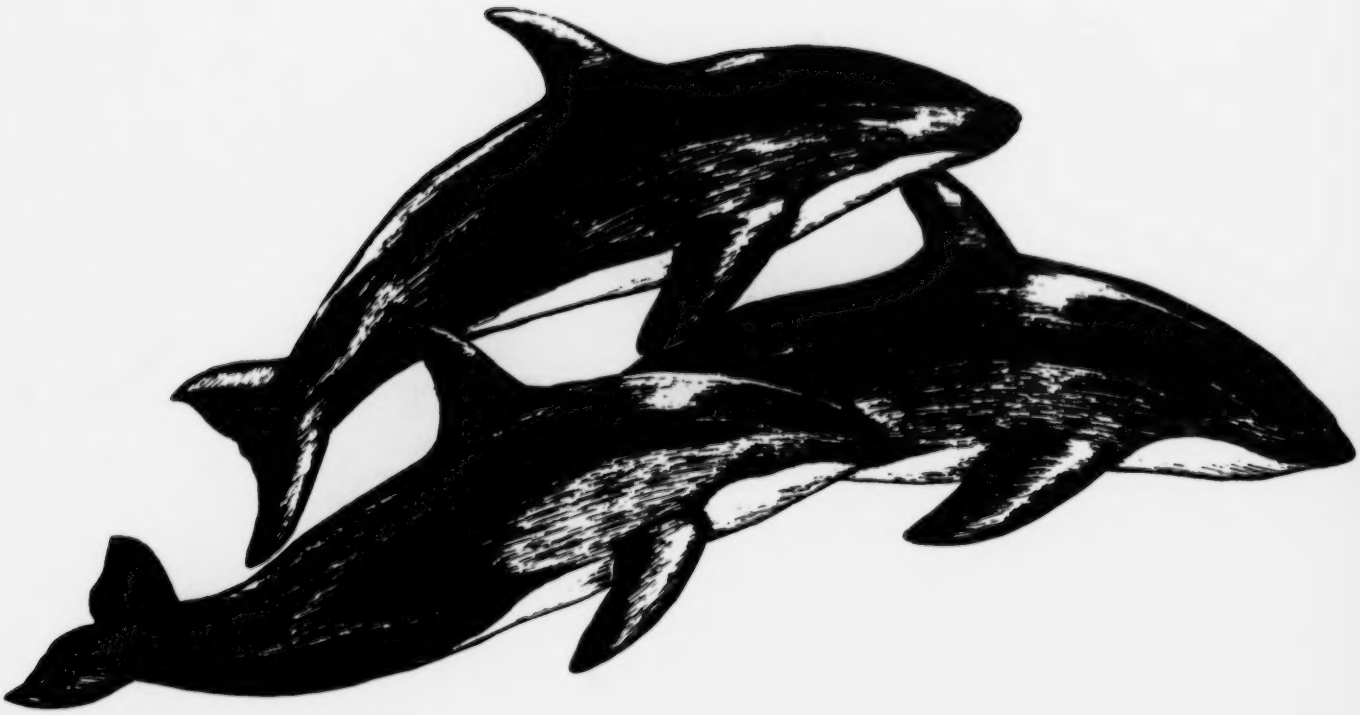
The course for the twenty-first century becomes increasingly clear. We must be wise in our use, reuse and conservation of finite resources. Also, we must routinely renew others. It also is clear that old habits must be broken. Our lands and waters can no longer be employed as dumping yards—the consequences are severe. What we do to our local environment may well affect ourselves and our neighbors, both at home and around the globe. Suddenly, the *Global Village* is not only tied together by virtue of a communications system, but by the far more complex and subtle ecological network, as well.

Although our problems may be severe, they still can be viewed as opportunities. Indeed, we, the writers of this document, see that the controversy revolving around acid rain, toxic waste, species extinctions, diminishing resources, pollution and the like, can be resolved. To believe otherwise obviously leads to apathy and a worsening of a problem. As educators, we provide pathways to understanding; through individual and community action these pathways can lead to enlightenment and solutions.

There is plenty of evidence that we're already succeeding. **Twenty years ago,** one of nature's most perfect creations was extinct as a breeding species in our land east of the Mississippi. **Today,** through the efforts of those who viewed the problem as an opportunity, we now find peregrine falcons nesting on the ledges of public buildings in metropolitan cities. **Fifteen years ago,** discarded bottles and cans plugged ditches and littered highways in Washington. **Today,** recycling is a multimillion dollar business across our state, and our open spaces are normally clean and uncluttered. **Just ten years ago,** production of trout and salmon in our Puget Sound streams had diminished to the point of vanishing. **Today,** they are increasing in numbers because individuals, schools, and service organizations stepped in to restore fish runs with cleanups and egg plants.

Our intention for these guidelines is to suggest specific directions for teaching kindergarten through twelfth grade students about our environment. As teachers, we have written for teachers, whether part of a school system, industry or government. These guidelines use many subject areas to spotlight the principles of our ecosystem. It is expected that with an understanding of these principles your students will learn to make decisions that are consistent with a quality environment. At some point the individual will develop the skills to work effectively in his or her community. These skills will enable the individual to participate constructively in the political process.

You will detect our sense of urgency and purpose in the pages that follow. We have an important educational task to pursue here, but it is a hopeful one that can lead to a better future. Implicit in these ideas is the belief that we will ultimately sustain a quality environment. It will not be achieved by quick fixes. Together, however, we can guide our students through the long and challenging process of learning.



An Approach for Environmental Educators

As environmental educators, we teach our students how they, as humans, are related to both their natural and built surroundings. This educational process has been considered from its inception to be interdisciplinary and problem-oriented. It is designed to help the learner understand how the environment works, and how he or she can identify solutions to environmental problems.

We have examined the trends of environmental education programs over many years to determine the most effective approach to the study of natural and human systems. This has led us to consider the quality of life, reflect a holistic approach to understanding, and have our students:

1. analyze environmental problems;

2. examine the pro and con arguments of a variety of public and private interest groups, including labor, business, and government organizations;

3. explore possible side effects of various environmental problem solutions;

4. predict both short-term and long-term implications of local, state, and national environmental programs;

5. articulate personal goals, desires, and life-style needs in terms of their aggregate regional, national, or global implications for energy use and resource allocation; and

6. make long-term life style decisions which maintain a proper balance between natural system and human system functions.

According to a thorough study by the Far West Regional Educational Laboratories, such capabilities can be achieved best through a program which adheres to the following precepts:

Environmental education should be holistic and integrated. Environmental education should focus on and clarify the complex relationships that exist between human and natural systems, and then examine the components and reciprocal functions of those systems.

Environmental education should be interdisciplinary, using information from a variety of fields, including natural sciences, social sciences, and the humanities.

Environmental education should be problem-focused and oriented to decision-making. Learners should become involved in real environmental problems or issues which are broad enough in scope to have regional, national, or global significance. Environmental education should engage learners in values clarification, problem-solving, planning, and decision-making processes. This must prepare them for dealing with environmental problems that affect both individual life styles and societal goals.

Essentially, Far West believes that the goals of Environmental Education can be achieved through a model of instruction that is based on a general systems approach. Such a model can show the many interactions that exist within our natural environment. The guidelines offered in these pages provide core themes and a conceptual structure that encourages educators to synthesize pertinent subject matter across and between a variety of traditional disciplines.

We have chosen to display the ten core themes of Environmental Education in the following chart. It is not possible to study absolutely everything about the environment and its problems. Therefore, we suggest that educational planners focus on these ten themes, across the K-12 grade span, as they work to accomplish the four goals and their related objectives (see "The Framework"). Planners are encouraged to use the following chart as a checklist to identify and specify the content of instructional

The 10 Core Themes of Environmental Education (A Conceptual Structure)

AIR QUALITY	WATER QUALITY	SOIL AND LAND USE
PLANTS, FOOD AND FIBER	HUMAN POPULATIONS AND SOCIETY	WILDLIFE AND DOMESTIC ANIMALS
MINERALS, ENERGY AND RESOURCE RECOVERY	AESTHETICS AND THE BUILT ENVIRONMENT	HAZARDS
COMMUNITIES AND ECOSYSTEMS		

How to Use These Guidelines

Let us now turn to an explanation of how one might use this document, keeping in mind the **ten core themes**.

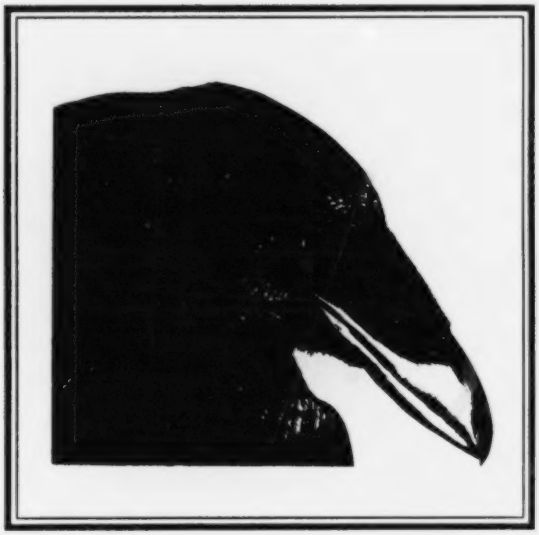
The **goals** themselves and their attendant **objectives** are broad and inclusive enough to permit the educator from almost any subject area to select appropriate environmental subjects upon which the class of any grade level can focus. We have not attempted to sequence the information because we believe that the teacher is quite capable of selecting the objectives and strategies that are important to his or her students.

The teacher should recognize that a student's environmental education may begin as early as pre-school and continue throughout his or her formal schooling, and beyond. Individual teachers may choose either to explore portions of the four goals during the course of the school semester, or find that only a single goal fits their subject area or priorities. For example, a high school level social studies unit is more likely to develop a unit under Goal IV: examining interest groups, and how they stimulate public awareness and effect change on behalf of the environment. On the other hand, a unit on health might be taught at the eighth grade level wherein, under Goal II, students will explore the relationships between a person's health and the condition of the surrounding environment. A fifth grade science unit could include the teacher's demonstration of how populations are limited in their growth by various factors in the environment.

To help the teacher carry out a goal, each objective is followed with the **learner outcome** that results from what the teacher has focused on. For example, as a goal we want students to "develop knowledge of the components of the environment and their interactions." One of our objectives in fulfilling this goal is to have the teacher "show that as the human population increases our impact on the environment becomes more pronounced." As a learner outcome, "the student will identify examples of human impact on the environment." The **instructional implications** that follow suggest to the teacher the various activities available to the students as a means of developing this understanding.

Also included in our document under Appendix A, is a general list of **curriculum programs and resources** that will provide the teacher with specific and detailed approaches for teaching to the goals and objectives. Each is annotated and referenced by subject emphasis, in the right hand margin. The **glossary** will help define terms that have specific environmental meanings. And finally, but by no means last, we've included a copy of the **1987 environmental education law** enacted by the Washington State Legislature. It requires, among other things, that instruction be given in "science with special reference to the environment..." and that teachers shall stress the importance and beneficial effect of "kindness to all living creatures and the land."

The opportunity for environmental education is before us and we hope that this publication will provide fresh momentum toward the fulfillment of a task of extraordinary importance.



THE FRAMEWORK FOR WASHINGTON ENVIRONMENTAL EDUCATION

I The student will develop knowledge of the components of the environment and their interactions.

Objective

A. The teacher will help students to recognize that the earth's living and non-living components are interrelated.
B. The teacher will show students that populations respond to the limiting factors of the environment.
C. The teacher will show that as the human population increases, our impact on the environment becomes more pronounced.
D. The teacher will help students to understand that people need to conserve the earth's natural resources.

II The student will value the environment as the basis of our physical lives, economy, and emotional well-being.

Objective

A. The teacher will demonstrate that human health responds to the quality of our environment.
B. The teacher will show that a viable economy is dependent upon responsible use of our natural resources.
C. The teacher will foster the concept that appreciation of nature's intricacy and beauty promotes tranquility and creative expression.
D. The teacher will communicate that respect for the earth and all its living things encourages people to maintain a quality environment.
E. The teacher will discuss how technology can modify the environment.

III The student will apply personal decision-making skills to enhance environmental quality.

Objective

A. The teacher will discuss how individual decisions and individual actions impact the environment.
B. The teacher will help students to understand that role models encourage the positive participation of others.
C. The teacher will lead a discussion on how personal decisions and actions alter the outcomes of environmental issues.

IV The student will develop and utilize the knowledge and skills necessary for cooperative action on behalf of the environment.

Objective

A. The teacher will discuss how cooperation among communities (including individual citizens, interest groups, businesses, governmental agencies, and others) is essential to improve, maintain, and enhance environmental quality.
B. The teacher will show how interest groups stimulate public awareness and effect change.
C. The teacher will foster the idea that involvement in the political and legal process is paramount to resolving environmental issues.

GOAL I

The student will develop knowledge of the components of the environment and their interactions.

"Nature is the greatest teacher." —Leonardo da Vinci

Objective A
The teacher will help students to recognize that the earth's living and non-living components are interrelated.

1. **Learner Outcome:** The student will distinguish the difference between living and non-living things.

   Instructional Implications: The teacher will provide opportunities for students to observe, compare, and classify living and non-living things (e.g., rocks, plants, insects, shells, sunlight and water) through field trips, hands-on experiences, and pictures.

2. **Learner Outcome:** The student will identify the components essential for life.

   Instructional Implications: The teacher will give students opportunities to grow plants under varying conditions and make students aware that air, land, water, and energy are essential for life.

3. **Learner Outcome:** The student will recognize that the sun is the primary source of energy.

   Instructional Implications: The teacher will show students how to identify the following types of energy and discuss how they can be traced to the sun.

   a. solar cells
   b. plants (photosynthesis)
   c. fossil fuels (petroleum, coal, natural gas) and refined products (oil and gasoline)
   d. water (hydropower)
   e. wind

4. **Learner Outcome:** The student will identify systems and cycles within the environment.

   Instructional Implications: The teacher will have students describe cycles by using activities such as "Adopt-a -Tree" ("stream," "beach," etc.), observing a compost pile, making rocks, and making rain in the classroom.

5. **Learner Outcome:** The student will describe ways in which living organisms and components of the environment are interrelated.

   Instructional Implications: The teacher will have students—

   a. construct food chains, model cities and space stations.
   b. set up a classroom aquarium.
   c. discuss biome (niche, habitat) communities.
   d. compare biomes: tundra, desert, ocean, forest, grasslands, mountains, etc.

Did you know that...

"The major components of an Ecosystem include: A *Nonliving Portion* composed of essential chemicals and the solar energy that drives the entire system. *A Living Portion* which consists of the *Producers* or plants, the *Consumers* and the *Decomposers* that complete the cycle by returning chemicals to the ecosystem for reuse."

Honeybees pollinate fruit, vegetables and other crops that make up 1/3 of our diet!

One acre (.4 ha) of trees can remove about 13 tons (11.7 t) of dust and gasses every year from the surrounding environment.

One thousand earth worms can turn out 55 pounds of rich soils from garbage every 110 days. *(National Wildlife)*

Habitat loss is the number one killer of most wildlife.

6. **Learner Outcome:** The student will understand that humans are a part of nature, not separate from it.

Instructional Implications: The teacher will use the following topics to establish that we have a kinship with nature:

a. endangered species
b. oil spills
c. filling wetlands
d. land use/systems management

The teacher will have students—

a. debate personal points of view.
b. review and discuss literature about humans and nature.
c. invite speakers that represent a variety of cultural backgrounds to share their views on the relationship of humans and nature.

Objective B
The teacher will show students that populations respond to the limiting factors of the environment.

1. **Learner Outcome:** The student will identify factors that limit populations.

Instructional Implications: The teacher will—

a. discuss the unprecedented rate of extinction of plants and animals.
b. use the "Spaceship Earth" concept to discuss finite resources.
c. project how long finite resources can support a growing population.

2. **Learner Outcome:** The student will describe the effects of limiting factors on a population.

Instructional Implications: The teacher will discuss—

a. the forces of natural selection, including population, cultures, species, food chains, evolution, and the diversity of plant and animal species.
b. the implications of altering an environment (i.e., putting a port in an estuary; monoculture; building marinas on shorelines).

3. **Learner Outcome:** The student will demonstrate the effects of limiting factors on a population.

Instructional Implications: The teacher will use experiments, simulations and/or games to show how limiting factors can affect a population.

Did you know that...

In the time it takes to read this sentence, six acres of forest will disappear. (from *Where Have All the Flowers Gone, Readers Digest* , April 1981)

Each year a section of rain forest the size of Pennsylvania is cut down and not restored.

Washington has the smallest land mass of the thirteen western states. However, we are second only to California in population density at 62 people per square mile.

Washington State has the largest population of resident bald eagles in the lower 48 states.

Objective C

The teacher will show that as the human population increases, our impact on the environment becomes more pronounced.

1. **Learner Outcome:** The student will identify examples of human impact on the environment.

Instructional Implications: The teacher will—

a. use an environmental impact statement to identify examples of human impact on the environment.
b. list examples of how various cultural imperatives have impacted students, neighborhood, city, state, country, world.
c. have students bring newspaper articles relating to human impact on the environment.
d. have students design and make posters depicting positive and negative impacts on the environment.

2. **Learner Outcome:** The student will demonstrate how increasing populations impact the environment.

Instructional Implications: The teacher will—

a. build a graph representing world population growth.
b. use "Population Task Cards" to simulate geometric and arithmetic growth.
c. discuss the implications of expanding human populations, using historical cases and the following broad topics:
   - the national interest
   - consumption of natural resources
   - famine
   - pestilence
   - war
   - a standing militia
   - cooperation among national agencies

3. **Learner Outcome:** The student will recognize that technological growth is exceeding our understanding of its impact on the environment.

Instructional Implications: The teacher will have students—

a. discuss examples of technological impact on the environment, including:
   - toxic waste from chemicals we use.
   - storage of nuclear waste.
   - over-prescription of antibiotics which creates super germs.
   - destruction of the ozone layer by fluorocarbons.
   - Washington issues such as:
     * the relationship of old growth and spotted owls
     * dune buggies and four wheelers
     * drives on ocean beaches
b. design a plan to influence a political resolution on an environmental issue.
c. select issues that are important in the school or locally and then involve political decision makers such as members of the student council, PTSA , school board and community groups, as well as principals and elected officials.

d. enlist a group of parent and community volunteers to create a local issues file.
e. develop descriptions that differentiate among local, state, and federal jurisdictions.
f. secure (or develop) a list of natural resource agencies and responsibilities.
g. study school playground rules as they affect the environment; suggest changes which enhance environmental quality.
h. examine recent cooperative resource management agreements between agencies and businesses such as timber or fish; evaluate their effects and suggest improvements.
i. launch a letter-writing campaign on behalf of an environmental concern.
j. use a question and answer session or conduct an interview to determine the degree to which resource agencies fulfill their mission (i.e., compare the goals of departments and agencies with their actual performances).
k. acquire a set of e.i.s. documents, land surveys, and platting systems, and then use critical thinking skills to analyze their effects.

Did you know that...

At least 62 percent of pesticides now used in the U.S. have never adequately been tested to see if they cause cancer: 60-70 percent have never adequately been tested for the potential to cause birth defects: 93 percent have never been tested to see if they cause genetic mutations. (from "Down on the Farm," *NOVA*, 1985)

Objective D
The teacher will help students to understand that people need to conserve the earth's natural resources.

1. **Learner Outcome:** The student will identify renewable and non-renewable natural resources.

   Instructional Implications: Teachers will have students —

   a. generate lists of natural resources that are:
      - renewable (under wise use) , e.g., water, trees, clean air, solar
      - non-renewable (finite) , e.g., fossil fuels, gold, copper, iron, aluminium
   b. trace a product from origin to use and disposal, and determine what resources are used.

2. **Learner Outcome:** The student will describe how conservation practices affect natural resources.

   Instructional Implications: The teacher will—

   a. provide students with field trips, speakers, films, literature and activities related to conservation practices.
   b. have students generate a list of ways that they can conserve water at home or school (electricity, gasoline, paper, aluminium, etc.).

3. **Learner Outcome:** The student(s) will plan and implement a conservation project for a local area (e.g., classroom, schoolground, home, neighborhood park).

   Instructional Implications: The teacher will—

   a. provide students with a list of relevant issues associated with conservation.
   b. have students devise solutions to conservation issues (i.e., paper use in the classroom; energy consumption in the home; management of salmon, wildlife, forests, and water).

GOAL II

The student will value the environment as the basis of our physical lives, economy, and emotional well-being.

"I went to the woods because I wished to live deliberately...to confront only the essentials of life..."
—Henry David Thoreau, Walden Pond

Goal II: The student will value the environment as the basis of our physical lives, economy, and emotional well-being.

Objective A
The teacher will demonstrate that human health responds to the quality of our environment.

1. **Learner Outcome:** The student will describe elements of a quality environment.

Instructional Implications: The teacher will—

a. use the inquiry process to develop an understanding that clean water, air, space, and soils are an intregal part of our healthy environment.
b. have the student state ways in which local environments enhance our well-being.

2. **Learner Outcome:** The student will compare and contrast natural and man-made environmental hazards.

Instructional Implications: The teacher will—

a. discuss or demonstrate impacts to the environment through natural events such as forest fires, floods, earthquakes, volcanoes, glaciers, erosion, mudflows, landslides, swelling (clay-rich) soils, hurricanes, tornadoes, etc.
b. explore the origin and implications of human-made hazards such as pesticides, acid rain, pollutants, agent orange, etc.

3. **Learner Outcome:** The student will evaluate alternative methods of dealing with potential hazards.

Instructional Implications: The teacher will—

a. ask resource people to provide information about hazardous materials and alternatives to their use, including:
   - county extension agents
   - local nursery people
   - exterminators
   - local hardware stores that can provide posters about herbicides and pesticides
b. have the students explore and analyze local areas to determine natural or induced changes.

4. **Learner Outcome:** The student will determine how cultural attitudes affect definitions of a healthy environment.

Instructional Implications: The teacher will have the students—

a. determine the approaches of various cultures to living effectively within the environment through:
   - architecture
   - gardening
   - landscaping
   - religious beliefs
   - others

Did you know that...

The 1815 Tambora Indonesia volcanic eruption killed 92,000 people.

Nearly half of the world's population depends on wood as its major source of fuel for heating and cooking. In fact, almost two-thirds of all wood cut in the world is used for fuel.

Mount St. Helens resulted in $1.1 billion damage.

The 1556 earthquake in Shensi Province, China killed 830,000.

Americans spray, dip, dust and pour about one billion pounds of pesticides into the environment each year. Of that, nearly 120 million pounds are applied in or around homes. *(Organic Gardening Magazine* Dec. 86)

15-55 percent of aerial spray misses the target (drifts). *(Pesticide Dilemma, National Geographic,* February 1986)

b. examine the correlation between exposure to environmental hazards and the pursuit of particular professions by:
- farm workers
- migrants
- miners
- factory workers
- urban dwellers

Objective B
The teacher will show that a viable economy is dependent upon the responsible use of our natural resources.

1. **Learner Outcome:** The student will understand the environmental impacts of supply and demand components of the economy.

Instructional Implications: The teacher will—

a. explore with the students how the following economic terms relate to the environment:
- net energy
- GNP trade-offs
- supply and demand
- profit margin
- gross income
- net income
- marginal return

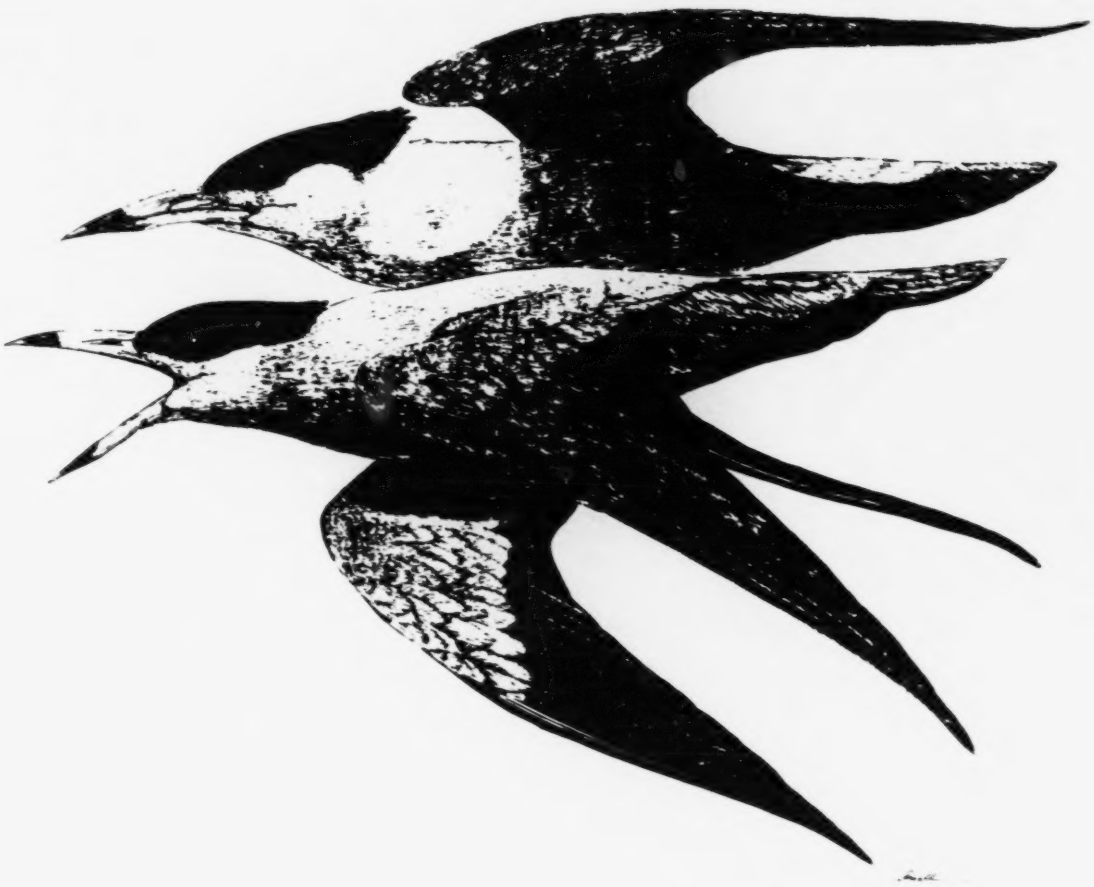
b. illustrate economic interaction through the use of simulations.
c. use varied media to explore economic systems.

2. **Learner Outcome:** The student will compare, contrast, and evaluate responsible and irresponsible use of our natural resources.

Instructional Implications: The teacher will have students—

a. research and analyze the influence of natural resource industries:
- forestry
- mining
- fishing
- power
- recreation
- agriculture
- hunting

b. use field trips to explore environmental impacts first-hand.
c. create artistic projects that compare responsible and irresponsible uses of natural resources:
- drawings
- slides
- videos
- films
- paintings
- sculptures
- collages



Objective C

The teacher will foster the concept that appreciation of nature's intricacy and beauty promotes tranquility and creative expression.

1. **Learner Outcome:** The student will experience the aesthetic value of nature.

   Instructional Implications: The teacher will provide materials for students so they can observe design in leaves, driftwood, shells, and insect wings, through:
   a. specimens
   b. pictures
   c. slides

2. **Learner Outcome:** The student will compare various art forms and how they reflect cultural response to nature.

   Instructional Implications: The teacher will provide opportunities to examine literature, poetry, artwork, dance, and music of various cultures.

Objective D

The teacher will communicate that respect for the earth and all its living things encourages people to maintain a quality environment.

1. **Learner Outcome:** The student will describe ways in which people show respect for a quality environment.

   Instructional Implications: The teacher will have the class generate a list of ways people show respect for the environment through—
   a. recycling.
   b. car tune-ups.
   c. voting on environmentally-related issues.
   d. waste disposal.
   e. care of plants and animals.

2. **Learner Outcome:** The student will understand how a given culture interrelates with its environment.

   Instructional Implications: The teacher will have the students investigate ways in which cultures respond to the environment through—

   a. shelter.
   b. food.
   c. clothing.
   d. transportation.
   e. the type and amount of energy use.
   f. gardens and landscaping.

Did you know that—
Each Washingtonian produces about 4.5 pounds of solid waste per day. An educated guess is that Seattle's dog population produces over 3.7 tons of feces each year, most of which goes unscooped.

Did you know that...

In the United States alone there are over 15,000 different types of soil.

One inch of soil is lost every 15 years due to erosion in Iowa; in west Tennessee, one inch every three years is not uncommon. In the Palouse region of Washington some fields lose one inch every 18 months; that's 100 tons of soil off every acre every year! (from *Down on the Farm*, NOVA, 1985.)

On the average, it takes 500 years for natural soil building processes to create a single inch of soil (from *Down on the Farm, Nova*, 1985).

3. **Learner Outcome:** The student will understand the intent of an environmental law and the resultant public policies.

   Instructional Implications: The teacher will have the students apply their critical thinking skills in debating environmental law(s) about:

   a. shoreline protection (Shoreline Management Act)
   b. eagle sanctuary
   c. the use of lead or steel birdshot
   d. hazardous waste disposal
   e. Indian fishing rights (the Boldt II decision)
   f. marine mammal conservation (Marine Mammal Protection Act)
   g. *Acquisition of Unique Environments* (Chapter 472, Laws of 1987)
   h. secondary sewage treatment and clean water (Clean Water Act)
   i. waste disposal sites

4. **Learner Outcome:** The student will identify and understand the functions of resource, corporate, public, and governmental agencies that work directly with the environment.

   Instructional Implications: The teacher will invite representatives of resource agencies to describe the role of their agencies in managing the environment.

5. **Learner Outcome:** The student will demonstrate practices that show respect for the earth and its living things.

   Instructional Implications: The teacher will encourage participation in conservation programs and practices such as:

   a. "Adopt-a-... Program"
   b. a recycling project
   c. energy-saving alternatives
   d. water saving systems

Did you know that...

The harbor seal population in Puget Sound has been growing since passage of the Marine Mammal Protection Act, and in 1987 is estimated to be 5,000 animals.

"Every part of the earth is sacred to my people. Every shining pine needle, every sandy shore, every mist in the dark woods, every clearing and humming insect is holy in the memory and experience of my people."

—Chief Sealth

Objective E
The teacher will discuss how technology can modify the environment.

1. **Learner Outcome:** The student will identify change brought about by technology.

   Instructional Implications: The teacher will discuss the impacts of the Industrial Revolution.

2. **Learner Outcome:** The student will evaluate ways that technology has affected the environment.

   Instructional Implications: The teacher will have the students compare the positive and negative effects of technological advances in—

   a. mining.
   b. logging.
   c. agriculture.
   d. transportation.
   e. communication.
   f. construction.
   g. energy production.
   h. military.

Did you know that...

"A city the size of San Francisco disposes of more aluminum than is produced by a small bauxite mine, more copper than a medium copper mine, and more paper than a good sized timber stand. San Francisco is a mine. The question is how to mine it most effectively and how to get the maximum value from the collected materials." (David Morris, The Institute for Local Self Reliance, quoted in Worldwatch Paper 76—*Mining Urban Wastes: The Potential for Recycling*)

GOAL III

The student will apply personal decision-making skills to enhance environmental quality.

"The human mind is our fundamental resource."
—John F. Kennedy, message to Congress on education, Feb. 20, 1961

Objective A
The teacher will discuss how individual decisions and individual actions impact the environment.

1. **Learner Outcome:** The student will identify methods of making effective decisions.

Instructional Implications: The teacher will employ various strategies that promote effective decision making, such as—

a. **inquiry method** (identify problem, gather information, form a hypothesis, design a test, gather data, draw conclusions).
b. **open ended teaching** (divergent thinking; there is no "one" answer).
c. **cooperative learning** (interdependence of learners; a cross-cultural approach; peer teaching; team learning).
d. **direct learning** (intuition, e.g., some native American cultures).
e. **dialogical reasoning** (the student defends a position opposite to the one he or she holds on an environmental issue).
f. **discussion** about the diversity of learning styles among and within cultures.

2. **Learner Outcome:** The student will learn to—

a. identify positive and negative personal decisions that impact the environment.
b. analyze how past individual actions have impacted the environment.
c. take and defend a position on an environmental concern.

Instructional Implications: The teacher will give examples of environmental topics upon which personal decisions can be made:

a. litter, recycling, water flow control, energy use
b. overharvesting (depleted populations of marine mammals, waterfowl, shellfish, etc.)
c. deforestation /burns, clearcuts/reforestation
d. agricultural methods (herbicides, contour farming, crop rotation, monoculture, fertilizers, pesticides/biological controls)
e. soil conservation
f. packaging processes (biodegradable vs. non-biodegradable)
g. ozone layer (fluorocarbons)
h. burning of fossil fuels "greenhouse effect" (CO_2); acid rain
i. local building projects (school, home, community)
j. home gardening (pesticides vs. biological controls; chemical vs. organic fertilizers)
k. habitat loss (Puget Sound, wetlands, rain forest, desertification)
l. plastics and their effects on wildlife (e.g., netting)
m. personal practices and habits (have the students evaluate their environmental impact and plan positive changes)

Objective B

The teacher will help students to understand that role models encourage the positive participation of others.

1. **Learner Outcome:** The student will recognize those qualities which make a person environmentally responsible.

   Instructional Implications: The teacher will help students recognize those qualities that distinguish a responsible citizen:

   a. reflective decision making
   b. global thinking
   c. conservation orientation
   d. futuristic
   e. flexibity
   f. demonstrates environmental ethics
   g. bases decisions on scientific data
   h. makes decisions based on cultural heritage

2. **Learner Outcome:** The student will—

   a. identify positive and negative role models.
   b. compare and contrast role models.

Instructional Implications: The teacher will help students identify positive role models, past and present, using the following techniques:

   a. list, group, label
   b. brainstorm
   c. review national, historical, local, neighborhood
   d. interview; media scans

3. **Learner Outcome:** The student will participate in an activity that enhances environmental quality.

   Instructional Implications: The teacher will encourage students to—

   a. understand and evaluate why people join environmental groups; discuss "existence value."
   b. write letters to groups, congresspeople, and agencies.
   c. work for the Ecology Youth Corps.
   d. recycle.
   e. pick up litter.
   f. enhance the streams for salmon.

4. **Learner Outcome:** The student will evaluate himself or herself as a role model.

Instructional Implications: The teacher will encourage students to evaluate themselves as a role models by—

a. comparing themselves with role models identified in earlier activities
   - interviewing each other
   - preparing a news article on each other
   - modeling to encourage positive participation of others

b. long-term evaluation (by enhancement projects; through reflection; and by way of logs, journals, charts, time capsules).

Objective C
The teacher will lead a discussion on how personal decisions and actions alter the outcomes of environmental issues.

1. **Learner Outcome:** The student will—
   a. understand that both action and inaction affect the outcome of environmental issues.
   b. review past decisions and actions that have impacted the environment.
   c. debate the impact of an individual's decision or action on an environmental issue.

Instructional Implications: The teacher will employ the use of the cooperative learning process (synthesis, debate, panel, simulation, values clarification) to develop discussions around ongoing issues such as:

a. desert agriculture
b. wetlands loss
c. logging
d. water quality decline
e. fisheries (Pacific Rim Nations and salmon, tuna, dolphin, whales)
f. air quality
g. waste management
h. local changes (e.g., Puget Sound)
i. pesticides
j. game management
k. human populations (family planning)

2. **Learner Outcome:** The student will predict the consequences of different decisions related to environmental issues.

Instructional Implications: The teacher will—
a. utilize background materials in previous activities to determine future impacts on decisions.
b. utilize a hypothesis, inductive/deductive reasoning.
c. present architectural designs, proposed needs, drawings, computer programs, cartoons, etc.

GOAL IV

The student will develop and utilize the knowledge and skills necessary for cooperative action on behalf of the environment.

"I know of no safe depository of the ultimate powers of society but the people themselves; and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to inform their discretion by education."

—Thomas Jefferson

35

41

Objective A

The teacher will discuss how cooperation among communities (including individual citizens, interest groups, businesses, governmental agencies and others) is essential to improve, maintain, and enhance environmental quality.

1. **Learner Outcome:** The student will—

   a. understand the significance of the interactions and interrelationships of these groups and how they affect environmental quality.
   b. identify the role of resource agencies in enhancing the environment.
   c. examine the positive and negative impact of the economic community on environmental quality.
   d. recognize the diversity of cultural attitudes and practices, and the ways in which these cultures enhance and/or detract from environmental quality.

Instructional Implications: The teacher will have the students—

   a. collect data on how communities cooperate to improve, maintain, and enhance environmental quality.
   b. create a plan for a cooperative solution within a region and evaluate its potential effects on environmental quality.
   c. describe transportation systems within a region and evaluate their effects on environmental quality.
   d. integrate the nine ecological components (water, air, land, etc.) in understanding community cooperation.
   e. identify and utilize environmentally-related groups (federal, state, and local), and describe their roles and missions (i.e., Department of Natural Resources, Washington Department of Fisheries, Washington Department of Game, Department of Ecology, Department of Energy, U.S. Geological Survey, U.S. Forest Service, Soil Conservation Service).
   f. use environmental impact statements and discuss their purposes, review their components, etc.
   g. inventory habitats, preservation sites, wildlife sanctuaries, and refuges; discuss management implications of those areas.
   h. analyze the school habitat to determine a cooperative use of playgrounds, classrooms, etc.; evaluate the environmental impact of these issues.
   i. make population counts on a small scale.
   j. plan an environmental enhancement project in cooperation with another classroom.
   k. describe the unique role of Washington's trust lands (school trust lands; federal holdings, which include marine and freshwater holdings).
   l. locate a group that has a positive effect on an environmental issue and arrange coverage of its activities.

Objective B
The teacher will show how interest groups stimulate public awareness and effect change.

1. **Learner Outcome:** The student will—

   a. understand the nature and purpose of environmental interest groups.
   b. describe how economic values of individuals, companies, communities, etc., influence final decisions.
   c. identify several methods used by interest groups to influence change.

Instructional Implications: The teacher will have the students—

   a. name interest groups (with focus on resources and the environment) which stimulate public awareness and promote change; list their achievements.
   b. use directories of environmental resource groups (EPA Directory; The Conservation Directory; etc.).
   c. inventory local environmental interest groups (EPA Directory; The Conservation Directory; etc.).
   d. create an organization which focuses on a particular environmental concern.
   e. invite speakers to present their point of view on environmental issues (lobbyists, elected officials, planning commissioners, cultural representatives, etc.).
   f. research the social history of individuals and environmental interest groups in America.
   g. write biographies of environmental activists past and present (R. Carson, J. Muir, G. Pinchot, T. Roosevelt).
   h. use mailing lists of the environmental groups and agencies to request;
      - information describing the organizations
      - film references
      - bylaws (to act as models for simulating or forming a new organization).
      - annual reports and issue papers
   i. find evidence of Industry's commitment to improving environmental quality and operating within the framework of existing laws.

Objective C
The teacher will foster the idea that involvement in the political and legal process is paramount to resolving environmental issues.

1. **Learner Outcome:** The student will—

   a. identify the structure of the political and legal processes.
   b. describe the relationship between the legal and political processes that are important in solving environmental issues.
   c. recognize that change is normal, and that the direction and impact of change depend on both individual and collective efforts.
   d. participate as an active citizen in the legal/political system to achieve a change in environmental quality.

Instructional Implications: The teacher will have students—

a. simulate political processes to resolve an environmental issue (based on documents obtained form the Secretary of State of Washington).
b. role play a political discussion on an environmental issue.
c. secure a list of governmental offices and incumbents at local, county, state, and national levels (available at county election office).
d. obtain a list of environmental state and national laws from:
   - Attorney General
   - Department of Ecology
   - Washington State Department of Wildlife
   - Environmental Protection Agency, Region 10
   - Washington State Department of Fisheries
   - Washington State Department of Agriculture
   - Bureau of Land Management
   - Army Corps of Engineers
   - Coast Guard
e. request copies of bills from legislative representatives or curriculum materials from school districts or the Superintendent of Public Instruction on the following:
   - toxic waste
   - supertanker in Puget Sound
   - Hanford
   - the Boldt Decision
   - big horn sheep in the Olympics
   - Columbia Gorge
   - oyster beds
   - Ross Dam
   - I-90
   - eagle feather sale and use
   - ASARCO
   - Commencement Bay
   - Bowerman's Basin
   - oil spills in Puget Sound

Did you know that...

"The right of taking fish at all usual and accustomed grounds and stations is further secured to said Indians, in common with all citizens of the territory...(clause from 1854-1855 Indian treaties and basis for Boldt II decision.)

45

Steps in Carrying Out
The Environmental Education Program

We recommend a systematic approach for developing and managing your school or district's environmental education program. In order to make progress in environmental education, several things are necessary:

Money to pay for doing what is needed to make environmental education work.

People who will do the work to make environmental education work.

High quality educational **materials.**

A **means** of getting the materials into the hands of the people involved in environmental education.

Means to **sustain** the **dedication** and enthusiasm of the people involved in environmental education.

A plan for managing and coordinating all the parts of the program.

The following planning diagram describes the elements to consider as your program moves forward. The elements are described below, and shown visually on the following page. Consider each of the elements individually, and then examine the relationship of each element to each other and to the whole planning sequence.

Elements of the Environmental Education Program

1. Authority is defined by the legal and policy statements at both the state and local level that permit and encourage environmental education program operations.

2. Planning and management sets into motion the considerations necessary for each of the system elements to function successfully, independently, in relationship to each other.

3. Curriculum and learning systems development is largely concerned with developing, selecting or modifying program materials to meet the pre-stated instructional goals and objectives.

4. Staff development provides new knowledge and skill through inservice education of the teachers and administrators who will provide direct instruction and supervision for the success of the program.

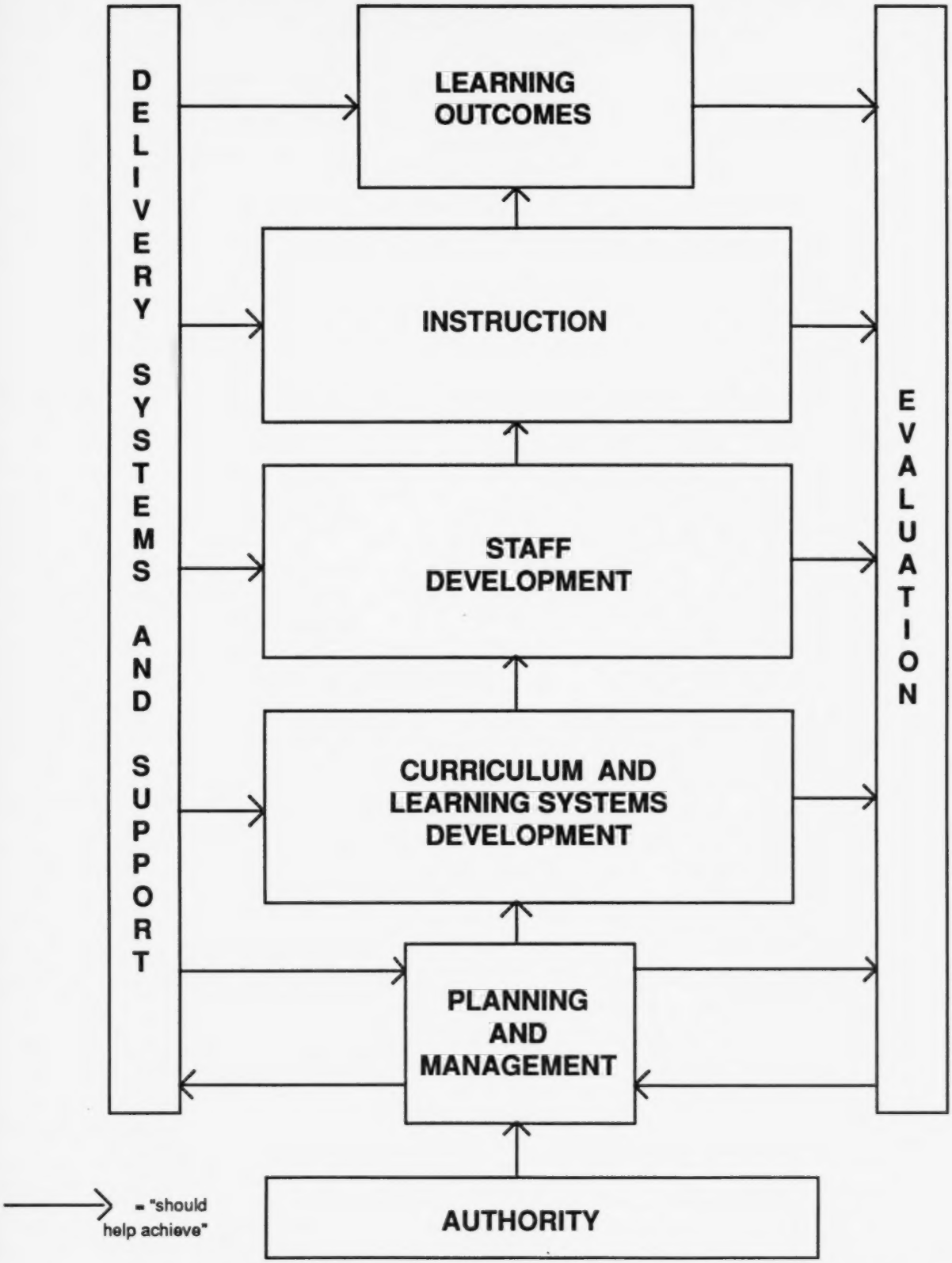
5. Instruction includes the conduct of the programs selected in the curriculum area, and should be structured to achieve the goals of instruction.

6. Learning outcomes is the realization of instruction and the achievement of the pre-stated goals and objectives of instruction. This component provides the major portion of this document and includes a description of learners after instruction.

7. Delivery systems and support includes activities and resources that allow the program to be conducted successfully such as policy, development, financial support, transportation, personnel, media, and management functions at the district or building levels.

8. Evaluation is a continuing set of activities which includes gathering data about program functions and outcomes, analyzing them, and providing feedback for planning and management considerations.

Environmental Education Planning Model



Modified from **Designs for the Future of Environmental Education,** from the U.S. Department of Education.

Staff Development: The Program of Inservice Education

All teachers and administrators will need a planned program of inservice education. Such a program will enable you to review the content, program materials, and instructional strategies so that you can utilize them more effectively.

The environmental education inservice programs have one distinct advantage over most other inservice programs. They deal with critical issues that currently are impinging on the lives of the teachers, students, and their families. Another advantage is that many of these inservice activities can be held in naturally pleasing settings. This in itself can place participants in highly involving and satisfying activities.

Educators who wish to plan effective inservice programs should carefully consider the following:

- the present skill and knowledge level of participants
- the other expectations or pressures that teachers are experiencing
- the need to involve teachers and administrators in the planning, scheduling, and implementation of the inservice sessions
- that the sessions need to be practical and consistent with the philosophical direction of the school district
- the realization that substantial competence exists among the educators themselves resulting in positive peer support and acceptance
- the need to orient outside experts thoroughly to the specific methods and activities that are to be conducted
- the realization that inservice education programs need to be long-term, include follow-up with individuals, provide positive feedback, raise expectations, and result in the changed behavior of the individual

Types of Inservice Activities

The variety of inservice activities is limited only by the creativity of the planners, time limitations, and cost considerations. The following samples of inservice education activities are only a few of many that are suitable.

Courses and Workshops

University Credit Courses and Workshops
established catalog courses
special purpose, locally adapted courses or workshops

Governmental Agency Workshops
hazardous waste by Department of Ecology
forest ecology by Department of Natural Resources
soil and water conservation practices by Soil and Water Conservation Districts
recycling by Department of Ecology

"Make and Take" Workshops
learning centers
game construction
puzzles
measuring equipment (for example, weather instruments)
teaching aids

Curriculum Materials Workshops
Project Learning Tree

Project Wild
Energy, Food and You
marine and aquatic programs from Educational Service District 114 or Seattle Aquarium

Curriculum Development Workshops
creating new curriculum materials
writing a course of study
choosing curriculum materials

Field Trips and Discussion Groups

Energy and Resource
granary
freight yard
meat packing plant
foundry
quarry
food processing plant
power generating plant
manufacturing plants

History
famous farms
urban restorations

Classroom Visitations
in the same school district
in other school districts

Natural Environment
parks, preserves, forests
lakes, rivers, streams
hiking and biking trails
white water rafting or canoeing

Nature Study Facilities
nature centers
parks
camps
outdoor education centers such as Cispus or Environmental Learning Centers in state parks

Pollution Control
waste water treatment plant
strip mine (Centralia)
soil conservation practices site
reclamation site
recycling center
chemical plant

Animal and Plant Collections
arboretums
zoos
natural history museums
commercial animal collections

Discussion Groups
discussing trends in energy and resource conservation, recent research reports, innovative programs.

Ways to Evaluate The Environmental Education Program

A wide variety of ways of carrying out evaluation studies have become commonplace. The table that follows this discussion presents four major categories of evaluation studies. It highlights some special cases within each category. These prototypes should aid the program staff in considering possible ways to evaluate your environmental education program(s).

One type of evaluation design is directed toward the program impact. In this (and most) impact studies, the planner identifies one or a small number of "outcome variables." Then data gathering is organized around the variables. Other examples of program outcome variables are: attendance at meetings, referendum votes, newspaper coverage, familiarity with the environmental problem, and donations.

We take note of two kinds of *impact* designs:

a. gains in performance over time

b. regression of background and process variables on outcomes

The approach usually suggested by measurement specialists and educational psychologists is **"testing to measure student gain."** It relies on instruments developed or selected to match specifications of objectives. In the special case of the Goal-Free approach the specification of objectives may be informal and made by the evaluators rather than the program staff. This study is likely to give the most accurate indication of student (or other beneficiary) impact. It is, however, unlikely to indicate what caused it or how to improve upon it.

Those studies designed primarily to explain the impact of the program are **Regression Analysis** studies. The term is generic, not limited to those where a formal statistical test of regression effects is made. Any effort to study the covariation or contingency of process with outcome can be classified here. The strength of the approach lies in its accuracy and control, the weakness in its assumption that the things worth attention will show up having a variation of scores available for analysis.

Similarly, we have taken note of two kinds of *process* designs:

a. the representation of program information in testimony and indicators for management systems

b. the naturalistic and experiential study of ordinary program activity

A management information system is attractive to many large organizations. It is expected that the worth of various organizational efforts can be better judged if there is a regular flow or special study of data related to the operational and policy decisions that managers are faced with. It is generally expected that personal experience will fall short of the knowledge and understanding needed, and that formalistic and highly conceptual (probably abstract) representations of the program are needed.

Naturalistic studies are different in that they concentrate on the more ordinary perceptions of practitioners and citizens. Skills of observation and interviewing are usually needed. The discipline of this inquiry comes in the validation and interpretation of data. Self-studies are among the least expensive, and ethnographic case studies are among the most expensive.

The Program Evaluation Manual was developed by the Office of Environmental Education of the U.S. Department of Education for evaluating a regional environmental learning system. It has provided direct assistance in formulating this component of the **Guidelines.**

A CLASSIFICATION OF PROGRAM EVALUATION APPROACHES

	Special Cases:	A Leading Advocate	An Exemplary Study	Advantages and Disadvantages
PERFORMANCE GAINS ANALYSIS AIM: Assess impact of program with regard to prespecified criteria	Discrepancy Evaluation Field Experiments Goal-Free Evaluation	Ralph Tyler Malcom Provus Robert Boruch Michael Scriven	Torsten Husen Dick Anderson House/Hogben	Keeps attention on the "bottom line," invests in performance testing; Over-simplifies educational aims, ignores ways to improve process
REGRESSION ANALYSIS AIM: Find significant covariates (background or process) of outcome variables	Survey Sampling Cost-Benefit Study Explanatory Observation	Lee Cronbach Hubert Blalock Henry Levin Bill Cooley	Daniel Weiler Fielden/Pearson Cooley/Leinhardt	Some control of conditions by researcher using robust sampling plans, analyses; Deemphasis on educational issues, particularly local circumstances
MANAGEMENT INFORMATION AIM: To keep good records, increase rationality in decisions	Policy Analysis Decision-Theoretic Adversary Evaluation	Peter Ross Jams Coleman Marcia Guttentag Tom Owens	Haveman-Watts Edwards, et. al. Murray Levine	Emphasizes policy, quality-control options of administrators, boards; Over-values efficiency, undervalues tacit knowledge of staff, constituents
NATURALISTIC STUDY AIM: Provide experiential understandings of complex workings of the program	Self-Study Blue Ribbon Panel Ethnographic Case Study	Egon Guba Paul Dressel Francis Chase Lou Smith	Knoll/Brown Plowden Report Stake/Easley	Probes complex concerns, responsive to issues; Subjective, poor meta-evaluation checks, unattentive to aggregate costs and benefits

IMPACT

PROCESS

Points of View

GAIA: Life From Earth

Since the early 1970s, a point of view has been developed and put forth that the earth is a living, breathing organism in its own right. Actually, this is an ancient notion that was put forth in the language of modern science by James Lovelock in the book *GAIA: A New Look at Life on Earth* (Oxford University Press). Lovelock examines our earth as a living organism of which humans are a part. He suggests that we are no longer just tenants, owners, or even voyagers on what might be considered the outmoded metaphor of "Spaceship Earth."

Traditional scientific opinion tells us that life is able to exist only because it was able to adapt to the physical and chemical changes in the environment. However, new evidence about the complex ways in which feedback loops link life with its environment indicates to some that this is not the case.

Lovelock's theory is that the earth has stayed a comfortable place for living organisms since life began three-and-a-half billion years ago, despite a vast increase of heat from the sun and the unstable mixture of reactive gasses which constitute its atmosphere.

This is because life itself (or the living organisms which make up the planet) has always worked actively to keep the planet fit for life.

The personal and ecological implications of this hypothesis are that we must pay attention to the degradation of the natural world. Two examples are tropical deforestation (and the climatic changes which accompany it), and loss of prime agricultural land and its topsoil. Such activities accumulate to destabilize the complex homeostasis upon which the continued life of the earth and its organisms depend.

TWO HATS...

Here's a statement that places the role of environmental educators into a helpful perspective. Thanks to author John Hug, Ohio Department of Education, for granting us permission to reprint the article for you.

It would appear that environmental educators have a bad case of the "two hat" problem. We have come by the problem naturally and therefore, we have paid little attention to it. The problem is simply that industry, utilities, labor, business, media and other segments of the population and the general public have consistently recognized only one hat when talking about environmentalists and environmental educators. It is not uncommon for dedicated environmental educators to be summarily dismissed as troublemakers—environmentalists. This one hat view is easily explained because environmental educators, personally, are almost always advocates for some point of view. Perhaps definitions will help clarify the problem.

Any world citizen who advocates with greater or lesser action that wrongs against our environment must be stopped is an environmentalist. Perhaps the negative reputation environmentalists have stems from the dramatic and radical actions of a few.

An environmental educator, on the other hand, is any world citizen who uses information and educational processes to help people analyze the merits of the many and varied points of view usually present on a given environmental issue. The environmental educator is not the "mediator," "trade-off specialist" or "activist" or "negotiator," but a developer of skills and an information analyst who prepares the people (from any segment of the population) who will participate in environmental decision making.

Environmental educators, therefore, need to be as "value fair" or "value free" as they can when working in this role. They must scrupulously strive to get all the facts, examine and illuminate all the viewpoints, and keep from letting their own particular position (as an advocate for a particular point of view) mix with their educator role.

My suggestion is simply that environmental educators make an effort to clarify the two distinct roles. At every opportunity, we should emphasize the neutral nature of environmental education activity. Strong advocacies are all around us, each using the techniques of persuasion and propaganda to build their constituencies. We must ourselves be familiar with all sides, stand firm for each advocate's right to be heard and provide a rational stage for informed debate.

Environmental educators have the right and the duty to be environmentalists, or advocates for some point of view, but the dual roles must adhere to the original premise—to keep each hat on its proper head, while utilizing to the fullest the professional skills of the environmental educators.

WASHINGTON'S SCHOOL TRUST LANDS: An Active Resource for Students And Teachers

Washington is uniquely endowed with nearly two million acres of land granted at statehood (1889) as a trust for the support of the common schools (K-12). These trustlands, along with another one million acres granted to eight other major trusts and two million acres of submerged lands (aquatic lands), are managed for the people of the state by the Department of Natural Resources (DNR).

These lands and their management provide an opportunity in nearly every educational service district for students to learn about a number of issues. These include political science and history (how and why grant lands were given to new states); surveying and cartography (where are trust lands located and how were they found); resource management (forestry, farming, and mining); resource protection (the Natural Area Preserve system); the concepts of public trust management; and (because DNR is a public agency), the role of the public in shaping resource management decisions on trust land.

The Common School trust lands of the state form a major endowment. By virtue of the Enabling Act which created the state, the Washington constitution, and subsequent laws and court cases, these lands must be managed as a trust, in perpetuity, to produce income to support construction and maintenance of schools. Each student in the state benefits from this endowment every day he or she is in a school facility. The history of the federal government granting lands to new states is rooted in medieval and colonial history and in the Northwest Ordinance of 1787. These provide the foundation to discuss the development of an important public policy relating to the long term conservation and use of natural resources.

Another element derived from the Northwest Ordinance is the basic land use system established by surveying and mapping. While the survey and mapping system physically located features in our country, this system mirrored how our society valued its land and resources. For example, great importance was given to education by our founding fathers who designated school trust lands in sections 16 and 36 of every township in each new state admitted to the Union. This policy, in turn, established an entire system of values and uses which continues to have widespread influence today on our land use policies.

In addition to managing for resource use, in the past two decades the state of Washington has broadened its concept of managing resources in the public interest by creating two other management systems— natural area preserves and conservation areas. Natural area preserves now number about 60. They are set aside for scientific and education use areas of unique plant or animal communities. These areas are strictly regulated to maintain their integrity and their presence in Washington's ecosystem. Conservation areas were first created in 1976 and expanded significantly in 1987. They removed areas of sensitive habitat or scenic value from intensive management use. Both programs are an attempt by Washington State to maintain our state's ecological diversity and uniqueness for future generations.

Washington's land grants today represent a heritage which is unique among Pacific coast states. It is an endowment which has been carefully protected since statehood and represents a concerted effort by Washington's citizens and policy makers to conserve our resources and land for use by future generations. Washington has expanded its public land stewardship policy to include areas of unique scientific, environmental, recreational or scenic value. Developing in students a "land use ethic," based upon on-site knowledge and understanding of prudent state management, is critical if future generations are to be environmentally literate citizens of Washington. Familiarity with state lands management and policies should be a key part of the environmental education curriculum.

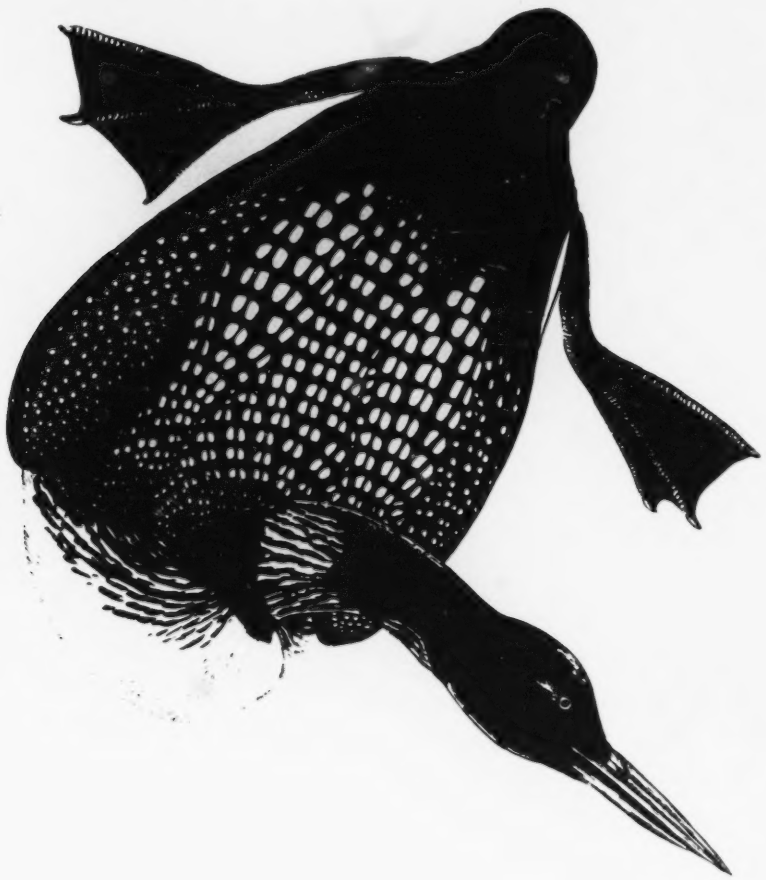
Curriculum Programs and Resources

Washington State has a diverse and special environment. We, as educators, are fortunate to have a wide range of innovative programs to help us impart the wonders of our state to our students. The resources that we have chosen can be used to integrate national and regional approaches to environmental education.

At the end of this list of curriculum resources, you will find the resources cross-referenced by category (e.g., "Energy," "Soils"). Computer software has not been included because the technology is changing so rapidly. Current lists of computer materials usually can be obtained from catalogs.

We would like to thank the Ohio Department of Education for sharing their resource lists and granting permission to select and use the parts important to the Washington curriculum.

Although you will find a wide range of programs below, they represent just a few of the many imaginative Environmental Education programs that have been developed by government, organizations, and industry in Washington State.



Curriculum Programs And Resources

The American Institute of Architects. **The Sourcebook : Learning by Design II.** 1735 New York Avenue, NW, Washington, DC 20006-5292. 1987.
This looseleaf book contains sources of environmental education activities, model programs, an annotated bibliography, and a listing of people serving environmental educators.

BUILT ENVIRONMENT

Barbara A. Barchi. **The Environment and Technology Project.** 1633 North Burling, Chicago, IL 60614.
This high school level program is designed to generate concern regarding the environment and technology in our nation and neighborhood. It is organized around societal issues and enables students to apply science and social studies knowledge to the resolution of local problems.

SOCIOLOGY

Canfield, Jack, and Harold C. Wells. **100 Ways to Enhance Self-Concept in the Classroom.** Englewood Cliffs, NJ: Prentice-Hall, Inc. 1976.
The authors have compiled some of the most gentle, instantly useful and gripping exercises, strategies and techniques. Their long experience and their dedication to the notion that positiveness makes people grow illuminate every page. Teachers will find the concise clarity of the descriptions of each strategy almost magical. (abridged from the foreword by Sidney Simon.)

LEARNING DYNAMICS AND VALUES

Christensen, John. **Global Science: Energy, Resources and the Environment,** Dubuque, Iowa: Kendall-Hunt. 1984.

ENVIRONMENT

Cornell, Joseph Bharat. **Sharing Nature with Children.** Ananda Publications, 900 Allegheny Star Rd., Nevada City, CA 95959. 1979.
This assortment of nature education activities and games involves direct experiences. The book stresses that the activities require no complicated equipment and no special expertise on the part of the adult leader. All that is needed is a sensitivity to nature and people.

NATURE AND OUTDOORS

Delta Education, Inc. **Outdoor Biology Instructional Strategies (OBIS).** Delta Education, Inc., Box M, Nashua, NH 03061-6102, 1975.
This program, designed for youngsters ages 10-15, promotes the understanding of ecological relationships. Packaged into sets of 24 folios, the hands-on activities emphasize the managed environment. Flexibility allows for adaptations. These materials were developed by the Lawrence Hall of Science at the University of California, Berkeley.

ECOLOGY

Ehrlich, Anne H., and Paul Ehrlich. **Earth.** New York: Franklin Watts, Inc. 1987.
The Ehrlichs provide a summary of the earth's environmental predicament by considering origins of these changes and the necessity of using caution in all operations affecting the earth's systems. The reference is excellent.This work provides timely and relevant topics for intensive discussion.

ENVIRONMENT, HISTORY AND ISSUES

Environmental Protection Agency, Region 10. **Public Interest Groups.** Region 10 EPA Library, 1200 Sixth Avenue, Seattle, WA 98101. Edited by M.M. Neilson who has assembled Northwest organizations, addresses, contacts and activities.

DIRECTORY

—**Youth Environmental Education Resources Directory.**1987. A directory for Washington, Oregon, Alaska and Idaho, oriented to the lower grades. Resources from agencies and industry. Includes suggested site visits.

DIRECTORY

Global Tomorrow Coalition. 708 SW Third Avenue, Suite 227, Portland, OR 97204. **Teaching Information** focusing on global issues.

ECOLOGY

Hoessle, Kirk, and Steven Van Matre. **Earth Magic** and **Snow Walk.** Institute for Earth Education, PO BOX 228, Warrenville, IL 60555. 1980.
These two booklets blend activities based on the acclimatization philosophy into two, hour-long walks. The activities offer participants a fresh way of looking at familiar things or an interesting introduction to the worlds of nature never before experienced. The acclimatization walks provide a vehicle for leaders interested in a discovery-oriented medium that promotes sensing, empathizing and sharing. Snow Walk is most useful in the winter, while Earth Magic could be used during other seasons. Each walk packet is sold separately.

ACCLIMATIZATION AND NATURE

—**Sun Ship Earth.** 1979.
A carefully structured and ordered program is outlined for a five-day resident camp. The emphasis is on providing the larger picture, and looking at natural systems and how people are a part of those systems. The program is based on the acclimatization philosophy of direct involvement.

ENERGY AND ACCLIMATIZATION

Knapp, Clifford E., and Joel Goodman. **Humanizing Environmental Education**. Martinsville, IN: American Camping Association. 1981.
The authors have been involved in camp and school programs where respect for self and others, trust and caring, cooperation and a sense of community are explored. This book will tell you how to teach and encourage interpersonal rapport, openmindedness and curiosity; a sense of values (personal, social, and environmental); feelings of self-worth and confidence; and a community spirit among children and adults alike. The book artfully weaves together activities that expand consciousness of ourselves and of the natural world around us at the same time. (abridged from the forewords by Joseph Cornell and Jack Canfield)

LEARNING DYNAMICS AND VALUES

Lovelock, James. **GAIA: A New Look at Life on Earth**. Oxford University Press. 1977.
An examination of Earth as a living organism of which humans are part. See Appendix A for a detailed review and analysis.

ECOLOGY AND PHILOSOPHY

Marine Science Center. **Marine Science Project.** 17771 Fjord Drive NE, Poulsbo, WA 98370.
A collection of curriculum guides from a nationally recognized program. The guides include complete student texts and activity sheets, teacher background information on each activity, a bibliography of childrens' literature of the sea, as well as a bibliography of selected books about the marine environment (secondary level). The design of the guides is intended to improve scientific, reading and computational skills of the student.

MARINE

Massachusetts Audubon Society. **Energizers.** Public Information Office, Massachusetts Audubon Society, Lincoln, MA 01773. 1985.
This guide lists energy education materials for grades 6 through 8. Items are reviewed and information for obtaining materials is included.

ENERGY

Miller, G., and J. Tyler. **Replenish the Earth.** Wadsworth: Belmont, CA. 1972.
One of the best general introductions to the scientific basis for understanding the environment. An excellent teacher reference for information and the scope of the problem.

ENVIRONMENT

National Wildlife Federation. **The Conservation Directory** (updated each year). 1412 Sixteenth Street, NW, Washington, DC 20036-2266.
A list of organizations, agencies, and officials that are concerned with natural resource use and management.

DIRECTORY

—Naturescope.
Naturescope is a periodical designed to improve the teaching of nature and natural science, primarily for elementary grades.

NATURE

Pacific Science Center. **ORCA: Ocean Related Curriculum Activities.** Pacific Science Center's Gift Shop, 200 Second Avenue North, Seattle, WA 98109.

MARINE

Pepi, David. **Thoreau's Method: A Handbook for Nature Study.** Englewood Cliffs, NJ: Prentice Hall, Inc. 1986.
This book is divided into two parts: SKILLS and EXCURSIONS. Moth study, goldenrod ecosystems and bog study are just a few of the items included.

NATURE

Population Reference Bureau. **An Introduction to Population** Dynamics (A Teaching Kit). Population Reference Bureau, 2213 M Street NW, Washington, D.C.
Visual aids, essays, wall charts, posters, glossary, and a student chartbook make this a usable resource. It also contains a teacher's guide to help with the lessons on population fundamentals, migration, population growth, urbanization, future trends, and more.

POPULATION

Simon, Sidney B., Leland W. Howe, and Howard Kirschenbaum. **Values Clarification. A Handbook of Practical Strategies for Teachers and Students.** Dodd, Mead and Co., 75 Madison Avenue, New York, NY 10016. 1972.
Values clarification is not concerned with the content of a person's values, but rather with the process of valuing and how a person

LEARNING DYNAMICS AND VALUES

comes to hold a certain value. The strategies listed in this and other values clarification books provide useful ideas.

Soil Conservation Service. **Conserving Soil.** Soil Conservation Service Field Office, U.S. Department of Agriculture, Washington, D.C. 20250.
For grades 6-9, this program is an interdisciplinary study of soils. With 24 spirit duplicating activity masters and four full color transparencies, the program balances in-class and outdoor learning experiences.

SOIL

Stapp, William B., and Dorothy A. Cox. **Environmental Education Activities Manual.** 32493 Shady Ridge, Farmington Hills, MI 48018. 1974.
This complete K-12 environmental education program helps students become environmentally aware and responsible citizens. Skill-developing activities focus on problem solving, values clarification, and school-community environmental issues.

LEARNING DYNAMICS AND VALUES

Toxic Substances Education Group. **Toxic Substances in the Environment.** Huxley College, Western Washington University, Bellingham, WA 98225. 1982.
This is the definitive primer on toxics, written as a reference work for learners grade 7-adult.

HAZARDOUS WASTES

U.S. Department of Agriculture. **Resource Guide to Educational Materials About Agriculture: A Project of Agriculture in the Classroom.** Agriculture in the Classroom, Room 536A, U.S. Department of Agriculture, Washington, DC 20250.

AGRICULTURE

U.S. Environmental Directories. 1987. **The Directory of National Environmental Organizations.** U.S. Environmental Directories, P.O. Box 65156, St. Paul, MN 55165.
The addresses of over 400 non-governmental environmental and conservation organizations are given. Each organization is described for subjects including endangered species, wildlife, water and air pollution, hazardous and toxic wastes, environmental mediation and negotiation, etc.

DIRECTORY

Van der Smissen, Betty, et. al. **A Leader's Guide to Nature Oriented Activities.** Iowa State University Press, South State Ave., Ames, IA 50010. 1977.
Information on programming, as well as extensive sections on nature crafts, games, and outdoor living skills, is included. A good reference for resident outdoor education personnel.

NATURE

Van Matre, Steve. **Acclimatization.** Institute for Earth Education, PO Box 228, Warrenville, IL 60555. 1972.
This book represents a sensory and conceptual approach to ecological involvement. It is designed to help people of all ages build an awareness and understanding of themselves and the natural world.

— and Bill Weiler. **The Earth Speaks.** The newest book continues the development of the acclimatization philosophy.

LEARNING DYNAMICS AND ACCLIMATIZATION

Washington Department of Wildlife. **Project Wild.** Washington Department of Wildlife, Olympia, WA 98504.
Project Wild is a two volume (K-6 / 7-12) set of instructional activities related to habitat and wildlife.

WILDLIFE

Washington Forest Protection Association. **The Inseparable Parts: A Catalog of Environmental Education Programs in Washington State.** Lynne Guza and Jeannie Summerhays, editors. Project Learning Tree, 711 Capitol Way, Suite 608, Olympia, WA 98501. 1985.
Eighteen education programs available in the state of Washington are described for educators and youth leaders. Entries range from a solid waste management and recycling program (A-Way With Waste) to an interdisciplinary wildlife program (Project Wild).

CATALOG

Washington State Department of Ecology. **A-Way With Waste.** 4350 150th Avenue NE, Redmond, WA 98502.
An interdisciplinary K-12 curriculum for the study of "the fascinating world of trash." The 80 activities focus on the environmental consequences of unchecked accumulations of refuse and emphasize how changes in buying and disposal habits can take big bites out of the waste stream.

WASTE RECYCLING

Washington State Office of Environmental Education (Office of the Superintendent of Public Instruction). **Clean Water, Streams and Fish: A Holistic View of Watersheds.** Washington State Office of Environmental Education, 17011 Meridian Avenue North, Room 16, Seattle, WA 98133.
Two volume curriculum (K-12) with basic biology of salmon and their ecological community. Contents examine the fundamental threats to the stream and the fish populations while involving the students in both the solving of the problems, and the future planning needed to maintain the stream and fish populations. Some special emphasis is given to the Boldt decision and its implications. Interdisciplinary.

WATER QUALITY

—Coastal Zone Studies.
Middle school program with introduction to coastal zone formation through use of overlays and activities. Biological focus on the major coastal zone habitats, and their ecological dynamics. The social and political aspects of land use planning are explored. Plenty of diagrams and illustrations. Interdisciplinary, incorporating science, English and social studies.

MARINE AND PUGET SOUND

—Energy, Food and You. A two volume K-12 curriculum for the study of energy. Hundreds of activities, tables, charts and illustrations convey the nature of energy and its importance in society. A particular emphasis is placed on the conservation and wise use of our finite resources. This program, used throughout the United States, has been used in three foreign countries (Mexico, India and Japan), and is recognized as among the ten most outstanding curricula on energy in America. Thoroughly interdisciplinary with emphasis on science, social studies, English, art, and health.

ENERGY

——**Encounter with the Northwest Environment—Natural and Urban.**
A guide to the general study of the northwest environments: natural and urban. In the natural environment, 17 major ecosystems are examined in a general narrative. Levels of impact are considered in reviewing human use of the land and waters. The urban environment also is reviewed with special focus on Seattle. A look at the parts of the city and their functions provides the introduction.

ENVIRONMENT

——**Puget Sound Habitats and Charts.**
A general history of the geological and natural history of Puget Sound. A good teacher reference complete with habitat charts that make superb reference guides for the students who wish to explore the diverse biological communities of the Sound, and to understand the complex relationships of the seven habitats presented as well as species characteristics, adaptations, food webs and ecological niches.

MARINE AND PUGET SOUND

—**SLEUTH.** An activity guide investigating the proper handling, storage and disposal of hazardous consumer products used routinely in the home, garden and garage. With games and assorted activities for the intermediate school students.

HAZARDOUS WASTE

Washington Forest Protection Association, Western Regional Environmental Education Council and American Forest Institute. **Project Learning Tree: Supplementary Activity Guide for Grades K through 6.** 1986.
This book of 89 activities and a companion volume for grades 7 through 12 has received enthusiastic acceptance nationwide. Materials can be received only by attending a workshop.

FOREST AND TREES

Washington Superintendent of Public Instruction. **Satisfice.** A guide for educational consultants in resource management agencies.

EE CONSULTANTS

The Whale Museum. **Orca Adoption Program.** PO BOX 945, Friday Harbor, WA 98250. Students can adopt one of the 80 or so Puget Sound orca whales, by name. You receive the whale's photo i.d. picture, a certificate, biography, newsletter, etc.
—**Gentle Giants of the Sea.** A teaching curriculum about whales. K-6. 1986.

WHALES

Wheatley, John, and Herbert L. Coon, editors. **Teaching Activities for Environmental Education**. Volume III. ERIC Center, 1200 Chambers Road, Columbus, OH 43212. 1975.
This third volume of 154 activities covers grade levels K-12. Activities appropriate for all major curriculum areas are included. Each activity includes its original sources, grade level, purpose, and concept, as well as detailed directions. Other books in this series are excellent.

ENVIRONMENT

Worldwatch Institute **(Worldwatch Paper).** 1776 Massachusetts Avenue NW, Washington, DC 20036.
Periodic, up to date and objective papers issued on all matters relating to environment, from deforestation and "greenhouse effect" to world hunger, population and toxic waste. Also publishes the annual *State of the World Report.*

GLOBAL ISSUES

Program Topics
(referenced by theme)

Acclimatization
Hoessle (Earth Magic; Snow Walk; Sunship Earth)
Van Matre (Acclimatization; The Earth Speaks)

Agriculture
United States Department of Agriculture (Agriculture in the Classroom)

Built Environment
American Institute of Architects (Learning by Design II)

Catalogs of Programs
Washington Forest Protection Association
Superintendent of Public Instruction (SPI)
Washington State Office of Environmental Education (WSOEE) (programs and films)

Consultants
SPI (Satisfice)

Directories
EPA (Public Interest Groups in Region 10)
(Youth Environmental Education Resources)
National Wildlife Federation (Conservation Directory)

Ecology
Lovelock(GAIA)
Global Tomorrow Coalition (materials)

Energy
Massachusetts Audubon Society (Energizers)
SPI—WSOEE (Energy, Food and You)

Environment
Ehrlich (Earth)
Miller (Replenish the Earth)
Stapp (education and activities manual)
SPI—WSOEE (Encounter with the Northwest Environment—Natural and Urban) (film collection on environmental topics)
Wheatley (teaching activities)
Worldwatch Institute (world issues)

Forest and Trees
Washington Forest Protection Association, SPI, and the Western Regional Environmental Education Council (Project Learning Tree)

Global Issues
Global Tomorrow Coalition (materials and conferences).
Worldwatch Institute(Wordlwatch Paper; State of the World Report)

Learning Dynamics and Values
Canfield(self-concept in the classroom)
Knapp (personal, societal and environmental values in camp and school programs)

Simon (handbook of values clarification)
SPI—(Satisfice—a guide for educational consultants in resource management agencies)
Stapp (environmental awareness)
Van Matre (Acclimatization, a sensory and conceptual approach to ecological involvement)
(The Earth Speaks - more on acclimatization)

Marine Life
Marine Science Center (Marine Science Project)
Pacific Science Center (ORCA: Ocean Related Curriculum Activities)
SPI—WSOEE (Clean Waters, Streams and Fish) (Coastal Zone Studies) (Puget Sound Habitats and Charts)

Nature and Biology
Delta Education, Inc. (outdoor biology instruction)
Cornell (nature education activities and games)
Hoessle (Nature walks using acclimatization philosophy)
National Wildlife Federation (Naturescope— a periodical to help teach elementary nature education)
Pepi (skills and excursions: Thoreau's method)
SPI—WSOEE (Encounter with the Northwest Environment—Natural and Urban)
Van der Smissen (nature programs, crafts and games)

Population
Population Reference Bureau (charts, guides, posters, lessons)

Sociology
Barchi (The Environment and Technology Project)

Soil
Soil Conservation Service Field Office (soils)

Waste
WSDOE (A-Way with Waste - activities focusing on trash and the environment)
WSOEE (SLEUTH - guides, games, and activities focusing on hazardous wastes)

Water Quality
SPI—WSOEE (Clean Water, Streams and Fish)

Whales
The Whale Museum (Orca Adoption Program)
(Gentle Giants of the Sea)

Wildlife
Washington Department of Wildlife
Western Regional Environmental Education Council (Project Wild)

Program Development for Resource Management Agencies

The boxed excerpt below is from a document entitled **Satisfice: A Guide for Educational Consultants in Resource Management Agencies.** It is included in order to assist resource agencies in working with schools. The schematic on the following page also is from **Satisfice,** and is included to aid teachers in EE program development design.

How Resource Agencies Can Help

Send someone into a classroom to teach students a lesson or series of lessons;

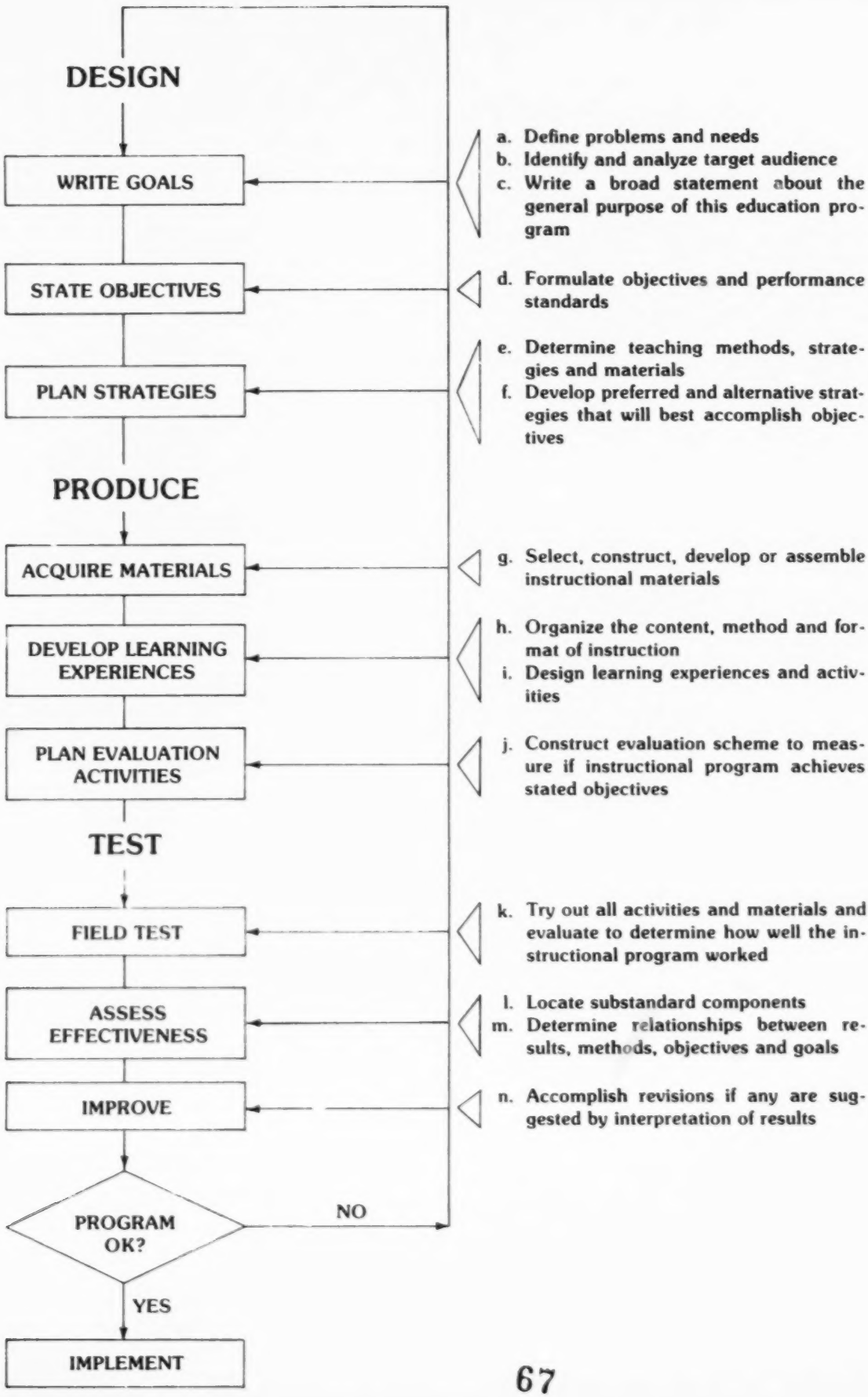
Teach the teachers about an area within your expertise;

Offer a special facility for students and teachers to visit;

Develop instructional and informational materials such as pamphlets, films, etc.;

Participate in environmental education curriculum development and facility planning groups; and

Lend your authority and moral support to educators trying to develop and operate environmental education programs.


DESIGN
WRITE GOALS
STATE OBJECTIVES
PLAN STRATEGIES
PRODUCE
ACQUIRE MATERIALS
DEVELOP LEARNING EXPERIENCES
PLAN EVALUATION ACTIVITIES
TEST
FIELD TEST
ASSESS EFFECTIVENESS
IMPROVE
PROGRAM OK?
NO
YES
IMPLEMENT
a. Define problems and needs
b. Identify and analyze target audience
c. Write a broad statement about the general purpose of this education program
d. Formulate objectives and performance standards
e. Determine teaching methods, strategies and materials
f. Develop preferred and alternative strategies that will best accomplish objectives
g. Select, construct, develop or assemble instructional materials
h. Organize the content, method and format of instruction
i. Design learning experiences and activities
j. Construct evaluation scheme to measure if instructional program achieves stated objectives
k. Try out all activities and materials and evaluate to determine how well the instructional program worked
l. Locate substandard components
m. Determine relationships between results, methods, objectives and goals
n. Accomplish revisions if any are suggested by interpretation of results

Glossary

aesthetic value
appealing to one's sense of the beautiful

affluent societies
wealthy societies composed of citizens with discretionary income

arithmetic growth
refers to growth at a constant rate rather than at an increasing or doubling rate, as in geometric growth

biodegradable
capable of being decomposed into innocuous products by natural, biological processes

biological controls
utilization of existing natural enemies of crop pests to control their numbers (e.g., ladybugs control aphids)

biome
a major land ecosystem (forest, savannah, desert, etc.) composed of individuals and communities of life

Boldt Decision
the controversial federal court decision affirming Native American rights to take fish "...at all usual and accustomed grounds and stations..."

built environment
the surroundings and setting constructed by humankind

bylaws
a law or rule governing the internal affairs of an organization

clear cuts
a practice of harvesting timber in which all the trees from a given area are removed

community
a population of different organisms living together in a particular area

conservation
the careful use of a resource, thus ensuring its availability over time

conservationist
one who actively conserves resources and supports policy which encourages or requires the same

conserve
the act of using resources wisely with an eye toward extending their availability for as long as possible

contour farming
plowing and planting in directions that match the slope of the land (other than in a straight row)

cultural imperative
the inclination or desire to impose particular traditions of one's ethnic or cultural heritage and values

culture
the arts, customs, beliefs and institutions created by a group of people at a particular time and place. These activities and products derive from, interact with and modify the environment.

deforestation
the total removal of forest cover either by cutting, fire or disease

demand
the level of need for a particular commodity at any given time

desert
a dry and arid region with limited vegetation and sandy soils

desertification
when a region is rendered into a desert through climatic changes or the action of humankind (e.g., the removal of forests)

DNR
the Department of Natural Resources, a state agency managing public lands and waters

DOE
the Department of Ecology, a state agency responsible for researching the ecological conditions of Washington, issuing permits, and enforcing laws relating to the environment

ecology
a branch of science concerned with the interrelationship of organisms with their environment

economic activity
the degree to which the production, development and management of material wealth is undertaken by a country

economic community
that portion of a community actively involved in the production, development or management of material wealth

economics
the science of the production, distribution and consumption of goods and services

ecosystem
the populations of a community which actively utilize the available energy, air, water, soil and chemicals of a given area to form an ecosystem

EIS
Environmental Impact Statement, which reviews the possible changes and impacts that would be made when a project could alter existing conditions

energy
the "work" that a physical system is capable of doing

environment
a total of those conditions and influences that affect the development and survival of an organism

environmental action group
an organization whose primary purpose is to initiate public or legal action benefiting the environment

environmental ethics
a general set of attitudes and values held by an individual that influence his or her choices and behavior consistent with maintaining a quality environment (i.e., recycling, conserving resources)

environmental hazard
a condition existing in one's surroundings which may be dangerous or threatening to health and safety (i.e., toxic spill, air pollution)

environmental impact statement
see EIS

environmentalist
one who is an advocate of environmental quality and seeks to protect and maintain this condition with a traditional focus on the natural environment

evolution
the process of change occurring over time

existence value
a term used by environmental economists to describe the value that is held of a resource through knowledge of its continued existence (i.e., persons who may never see or encounter a rare species will contribute to its support)

fisheries management
the management of our fisheries resource by the Washington State Department of Fisheries which sets catch limits, determines dates of fishing, and ensures that sufficient numbers of fish escape and are raised in hatcheries so that the resource is renewed

flow chart
a schematic representation of a sequence of operations

fluorocarbon
a compound in which fluorine connects to carbon (used as aerosol propellant, refrigerant, solvent, and lubricant, as well as in making plastics)

GAIA
the point of view that the earth is a living, breathing organism in its own right (see Appendix A)

geometric growth
growth by doubling, also known as exponential growth (i.e., 1, 2,4,8,16)

global thinking
a point of view that considers the international implications of such matters as acid rain, cutting of the rain forest, drought, scarce resources, hunger

GNP
Gross National Product, which is the total value of a nation's goods and services produced within a given year

GNP trade-offs
the inevitable costs of production that should be deducted from the total value, as they may include costs to human health, habitat loss, pollution, and the like: "There's no such thing as a free lunch."

greenhouse effect
the heating effect of the atmosphere upon the earth, as light from the sun is absorbed by the earth then radiated as heat waves which are absorbed by the air, specifically carbon dioxide

gross income
the total income before deductions

habitat
the location where an organism, population or community lives

Hanford
the center of nuclear power and plutonium production in Washington State

holistic
focused on clarifying the complex relationships existing between natural and human systems

hydrocarbons
a family of chemical compounds containing carbon and hydrogen that are found particularly in fossil fuels

indicator species
a species whose presence or absence suggests the quality of a particular environment (i.e., a canary in a coal mine is sensitive to dangerous gasses)

Institute for Environmental Studies
an institute at the University of Washington which engages in special studies, conferences, intra-departmental programs, and the publication of the Northwest Environmental Journal, which focuses on environmental issues

interdisciplinary
utilizing information in a coordinated way from a variety of fields or disciplines in order to deal adequately with all dimensions of environmental issues.

interest group
an organization whose primary purpose is to raise public consciousness, encourage the passage of legislation, or communicate with like groups over a common interest (e.g., Mothers Against Drunk Drivers, Puget Sound Alliance, Greenpeace, etc.)

intricacy
possessing many complex parts and referring herein to matters of our biosphere

irrigation
method of transporting water from areas of presumed abundance to locations having sufficient soils, but limited local water supply, for the purposes of crop production

limiting factor
a condition such as light, temperature or water that may restrict the ability of an organism to grow or survive

lobbyist
a person engaged in influencing legislation on behalf of a special interest

monoculture
the cultivation of a single product (such as corn or cotton), to the exclusion of other uses on a piece of land

multicultural
a society which supports the beliefs, customs and institutions of many groups within its political system

natural resource
a product occurring in a natural state which is viewed as a commodity by society

natural resource agency
a governmental body responsible for the administration, identification, description, experimental investigation and theoretical explanation of natural phenomena (e.g., the Department of Natural Resources, The Washington Department of Wildlife)

net energy
that amount of energy remaining in a food product after the energy used in its production is subtracted

net income
that income remaining after all deductions and expenses have been made

niche
a situation or activity specially suited to an individual's abilities or character, or total of functional relationships between an organism or population and its environment (i.e., what an organism does in its habitat; how it earns its living)

non-renewable
referring to resources which cannot be restored or renewed at a rate which would make them available to use at any time in the immediate future

non-renewable resource
a resource such as minerals, oil and coal that is found in fixed, depletable supplies on the earth

organic
pertaining to animal or vegetable produced chemical substances of basically carbon structure

organic gardening
a method of gardening or farming in which fertile soil is maintained with organic matter (such as compost and natural fertilizers) in order to ensure the health of the plant

organism
a living being

overconsumption
consuming more than what is required to maintain a reasonable standard of living (akin to wastefulness in matters of resource use)

overharvesting
depletion of a plant or animal resource which is normally managed for sustainable levels, due to mismanagement by individuals or societies

ozone layer
the layer of gaseous ozone (O3) in the high atmosphere that protects life on earth by filtering out lethal ultraviolet radiation from the sun

pesticides
any substance or chemical applied to kill or control weeds, insects, algae, rodents, and other undesirable pests (i.e., chlorinated hydrocarbons, carbonates, and organophosphates)

political process
that process available to the citizen in a democratic society wherein he or she may vote, file suits or influence policy to protect his or her rights and those of others

population
a group of organisms of the same kind

population count
a determination or estimation of the number of individuals within a group

preservation
action which maintains an area intact for the protection of wildlife and natural resource

preservation sites
an area maintained for the protection of biological diversity

preservationist
an individual who supports preservation as a means to maintain environmental quality

profit margin
the amount of monetary gain or return determined after sale of a product, once the initial costs and expenses are subtracted

Puget Sound
broadly defined as that body of saltwater extending southward from the Canadian border along Washington's interior coast, including the San Juan Islands, the Strait of Juan de Fuca, Hood Canal and waters south to Olympia

reforestation
replanting an area with trees after logging, fire, disease or drought

refuge
a haven or sanctuary for wildlife that may allow regulated hunting, but which is managed for the preservation of the habitat and user species

renewable
capable of being restored after use or consumption; speaking here particularly of those essential resources that, through careful management, may be renewed in perpetuity (including fisheries, forest products, and many grown food products)

sanctuary
a refuge for wildlife where predators are controlled and hunting is illegal (Webster's)

scientific method
the methodology which involves observation, identification, description, experimental investigation and theoretical explanation of natural phenomena

SCS
The United States Soil Conservation Service, a branch of the U.S. Department of Agriculture.

slash-and-burn
developed by felling and burning trees to make land arable, usually for a temporary purpose (Webster's)

"Spaceship Earth"
a metaphor for the earth as a finite ecosystem in which resources must be husbanded and the ever changing balance between humans and their environment preserved, if life is to survive

species
natural population or group of populations that transmits specific characteristics from parent to offspring. They are reproductively isolated from other populations with which they might breed

SPI—WSOEE
Superintendent of Public Instruction, Washington State Office of Environmental Education, Old Capitol Building, Olympia, WA 98504

supertanker
a large ship equipped to transport oil and other liquids in bulk

supply
the amount of a commodity available for meeting a demand or for purchase at a given price

technology
the application of science and design to help solve societal problems

USFS
United States Forest Service

USGS
United States Geological Survey

values clarification
defining a principle, standard or quality that is considered inherently worthwhile or desirable

waste
refuse which has the potential for secondary use (i.e., manure can be used as fertilizer)

waste management
a program or plan to handle and dispose of the wastes generated by individuals and society (i.e., sewage, toxics, nuclear waste, solid waste)

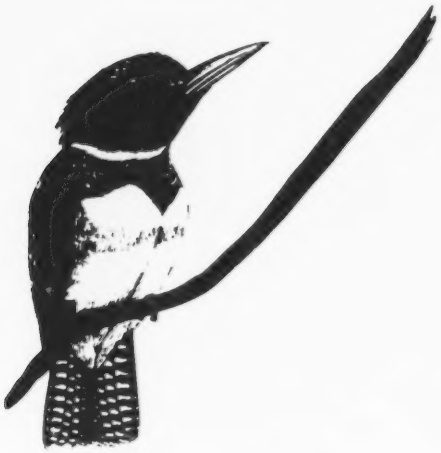
WDF
Washington Department of Fisheries, which is responsible for managing local marine and anadromous (migratory) fish stocks; enforcing laws, setting catch limits, seasons, etc.

WDW
Washington Department of Wildlife, which manages the plant and animal heritage of Washington by enforcing laws, conducting studies, setting aside and protecting habitat, and establishing hunting procedures for game species

wetlands
an area where the water table stands at or above the land surface for at least a portion of the year

wildlife sanctuaries
locations set aside for plants and animals wherein human activity is curtailed or prohibited, thereby respecting and protecting the breeding, feeding or resting of the species

YCC
Youth Conservation Corps, which involves students in summer employment programs that involve trail restoration, reforestation and cleanup of the natural areas of Washington



Legal Authority for Environmental Education

House Bill No. 770
STATE OF WASHINGTON
50th Legislature
1987 Regular Session
by Representatives Ebersole, Betrozoff, Pruitt, Walker, Valle, Rasmussen, Belcher, Schmidt, Rust, Unsoeld, Holland, Patrick, P. King, Winsley, Schoon, Holm, Todd and Spanel

Read first time 2/9/87 and referred to Committee on Education

AN ACT Relating to environmental education; and amending RCW 28A.05.010

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON

Sec. 1. Section 28A.05.010, chapter 223, Laws of 1969 ex. sess. as last amended by section 4, chapter 149, Laws of 1986 and RCW 28A.05.010 are each amended to read as follows:

All common schools shall give instruction in reading, penmanship, orthography, written and mental arithmetic, geography, the history of the United States, English grammar, physiology and hygiene with special reference to the effects of alcoholic stimulants and narcotics on the human system, science with special reference to the environment, and such other studies as may be prescribed by rule or regulation of the state board of education. All teachers shall stress the importance of the cultivation of manners, the fundamental principles of honesty, honor, industry and economy, the minimum requisites for good health including the beneficial effect of physical exercise, and the worth of kindness to all living creatures and the land. The prevention of child abuse may be offered as part of the curriculum in the common schools.

Passed the House March 18, 1987.

Speaker of the House.

Passed the Senate April 15, 1987.

President of the Senate.

WAC 180-50-115 Mandatory Areas of Study In the Common School. (1) Pursuant to RCW 28A.05.010 all school districts shall provide instruction in reading, penmanship, spelling, mathematics, geography, English grammar, physiology, hygiene, and history of the United States.
(2) Pursuant to RCW 28A.05.015, unless instruction in a language other than English will aid the educational advancement of the student, all students shall be taught in English.
(3) Pursuant to RCW 28A.05.070, after July 1, 1986, each school district offering a high school program shall provide a course of study which includes the preparation for uniform college and university entrance requirements as published by the council of postsecondary education.
(4) In addition to the requirements in the above subsections, each such school district shall offer all

required courses for a high school diploma as provided in chapter 180-51 WAC and shall provide an opportunity for high school students to take at least one course in the following areas of study:

(a) Art;
(b) Career education;
(c) Computer education;
(d) Consumer education;
(e) Economics;
(f) Environmental education;
(g) Foreign language;
(h) Health education;
(i) Home and family life;
(j) Music;
(k) Remedial education, including at least, remedial education in reading, language arts, and mathematics.

(5) Districts shall make available to all high school students enrolled therein the areas of study enumerated above either within the district or by alternative means which shall include equivalent education programs set forth in this chapter, interdistrict cooperative programs as permitted by RCW 28A.58.240, and/or the full-time or part-time release of such students to attend nonresident districts pursuant to chapter 392-137 WAC. [Statutory Authority: RCW 28A.04.120 (6) and (8) 84-21-004 (Order 12-84), § 180-50-115, filed 10/4/84.]

The Resource Agencies Tell Us...

"Education is essential for maintaining Washington State's high quality environment. Education prevents environmental problems and creates an informed citizenry, willing and able to act reasonably on behalf of our natural resources. Ecology encourages Washington's teachers to include Environmental Education at every opportunity in their day to day teaching."—

— Andrea Beatty Riniker, Director
State of Washington Dept. of Ecology

"Forests are all around us. Many of us in cities seem to live in or near them, but in our daily lives they are hidden in our walls, desks, tables, clothing, floors and books. Forests are everywhere.

"Our cultural definition of 'what forests are for' is constantly changing. Our growing knowledge and experience forces us to re-examine what we have, how we are affecting forests, and where we want to be in relationship to forests in the future.

"Are we amazed by the magnitude of wealth our national resources give us? The rest of the world is. Maybe living and working in cities we have lost some of our connectedness and sense of interdependencies. Environmentally, forests purify and cleanse urban air. Sociologically, they give us wonderful places for resting, working, and recreating. Economically, they offer a stable and renewable base of operation for current and future generations needing wood and forest products.

"Growing and nurturing forests is like educating children. Knowledge and experience are important, but time and commitment are what really count. This is why we—the forest industry—recognize that environmental education must be an integral part of the lifelong learning process. All of us share a responsibility to help our children, our future generations, and to become wise decision makers and stewards of the land.

"Through environmental education, we engage children in exploration of the world around them—stepping into the forest, finding their place, considering the challenges of meeting world demands on finite resources. Environmental education draws all of us together connecting us to the land."

—Washington Forest Protection Association and Project Learning Tree

"Water, our most crucial, seemingly unlimited natural resource, is now our most threatened. Predicted droughts, extravagant waste, and continued contamination are fast depleting or destroying our precious water resources. Water has become in the 80s what energy was in the 70s—a crisis of our own making.

An understanding of the problems and the development of a new set of values related to this precious resource are necessary to ensure our very survival.

—Mike Mercer
Seattle Water Department

"Washington's plants, animals, lands and water comprise a diverse environment throughout the State. The natural environment is a source of aesthetic value, inspiration, and enjoyment.

"Every aspect of our environment produces materials used in our daily lives. Direct use and recreational use of natural resources make a significant contribution to our economy.

"Responsible use of the land is basic to our survival as individuals, a state, a nation, and as people of the planet Earth. We recognize that educational institutions of the State are in the best position to develop environmentally informed citizens by instilling attitudes of stewardship, maintenance, and wise use of our environment.

"The members of the Washington Wildlife Commission support interdisciplinary environmental education as a component of basic education in all elementary and secondary schools in Washington State.

"We further support efforts of teachers and school districts to incorporate environmental education into their formal instructional programs."

—Dr. James Walton, Chairperson
Washington Wildlife Commission

DR. FRANK B. BROUILLET
Superintendent of Public Instruction

Old Capitol Building. FG-11. Olympia. WA 98504

IPS/617/87